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MINNESOTA MEDICINE

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VOL. V

APRIL, 1922

NO. 3

ORIGINAL ARTICLES

DULUTH AS AN ALL-THE-YEAR-ROUND HEALTH RESORT*

Comparison with Saranac Lake, N. Y.

ARTHUR T. LAIRD, M. D.

Superintendent, Nopeming Sanatorium
Nopeming, Minn.

Physicians in Duluth are constantly asked if it is not advisable for patients with chronic throat and lung afflictions to seek a milder and presumably better climate than Duluth. There is quite a general impression among those not well informed on the subject that there are undesirable features about the climate of Duluth which would render it advisable for most invalids suffering from diseases of the respiratory tracts to take long journeys to remote parts of the country for the sake of their health.

As a matter of fact, the climate of Duluth and vicinity is in many respects very similar to that of the Adirondack Mountains, in the State of New York, known the country over as a most popular resort summer and winter for patients suffering from pulmonary and throat diseases. Saranac Lake, the home of Dr. Trudeau, the pioneer in America in the successful treatment of tuberculosis, is especially famous in this regard, and has constantly in its population a thousand or more invalids, many of whom have come from the south and west to take advantage of the climatic conditions there present. Dr. Lawrason Brown has published a little pamphlet on "Some Weather Observations in the Adirondacks" covering a period of ten years, and fortunately we have for comparison Mr. Richardson's monograph on the climate of Duluth summarizing observations extending over forty-seven years.

The similarity of the climate of the two places has long been apparent to the writer and it is interesting to have this impression confirmed by these records of detailed observations as regards latitude,

altitude, temperature, rainfall and sunshine of the two places.

Latitude: Duluth, 46° 47' N. Saranac Lake, about 44° 30'.

Altitude: Duluth lies on and at the base of a range of hills that rise rather abruptly above the level of Lake Superior, which is itself 600 feet above the sea, to a height of 600 to 800 feet. Saranac Lake is about 1,500 feet above the sea.

The average elevation of the Adirondack Mountains is 1,600 feet, with peaks 1,000 to 3,000 feet higher.

Back of Duluth is a broad plateau which immediately reaches a height of 1,300 feet or more, and there are a number of places in St. Louis County 2,000 feet or more above the sea.

The Trudeau Sanatorium near Saranac Lake is located 1,625 feet above the sea. Nopeming Sanatorium, near Duluth, is about 1,300 feet above the sea.

Temperature: The annual average mean of temperature at Saranac Lake for a period of ten years was 41.57° F.; at Duluth for a period of forty-five years it was 39° F. The average mean of temperature by months in the two places during the same period is shown in the following table:

	Jan.	Feb.	Mar.	April	May	June
Saranac Lake..	15	15	28	41	54	63
Duluth	10	13	24	38	48	58
	Jan.	Feb.	Mar.	April	May	June
Saranac Lake..	60	63	57	46	32	19
Duluth	65	64	55	45	29	17

The close parallelism is at once evident.

It has often been stated with all seriousness in regard to each of the two places that the temperature reaches 40° below zero dozens of times each winter. As a matter of fact, the official records show that the thermometer has reached 40° below in Duluth but once in forty-seven years, and 38° below in Saranac Lake but once in the ten years under consideration. It has been 30° below or more on an average of not quite once a winter in Duluth.

A temperature of 90° or more was reached nineteen times in ten years in Saranac Lake and seventy-

*Prepared at the request of the St. Louis County Sanatorium Commission.

eight times in forty-seven years in Duluth—an average of twice a year in Saranac Lake, and not quite as often in Duluth.

Rain and Snow: In Saranac Lake the average annual precipitation for ten years was 34.5 inches. In Duluth during a period of forty-seven years it was 29.2 inches.

The comparison by months is shown in the following table:

	Jan.	Feb.	Mar.	April	May	June
Saranac Lake..	2.3	2.3	2.8	2	3	3.8
Duluth	1	1	1.6	2	3.4	4.2

	Jan.	Feb.	Mar.	April	May	June
Saranac Lake..	4.1	3.5	3.2	2.7	2.6	2.4
Duluth	3.8	3.3	3.6	2.5	1.5	1.2

The winters in Duluth are apparently somewhat drier than those in Saranac Lake; while the amount of precipitation during the spring, summer and autumn months is practically the same in the two places, the variations from month to month are strikingly similar.

The porous nature of the soil in the Adirondacks enables the rainfall to be rapidly absorbed. There are only a few clay beds in that region, and little soil of a character to retain moisture. In Duluth, on account of the free drainage on the hillsides and the excellent sewer systems, there is also little retained moisture, although the character of the soil is less porous.

Sunshine: The records at Saranac Lake for possible percentage of sunshine cover too short a time to be of great value. For a few years the average percentage has been 46.2. In Duluth, during forty-seven years, it has averaged 55 per cent. The high percentage in May, in Saranac Lake, is due to a severe draught extending during the spring months of 1903. The approximate hours of possible sunshine in the two places are indicated in the following table:

	Jan.	Feb.	Mar.	April	May	June
Saranac Lake..	26	36	46	56	72	46
Duluth	50	55	50	52	55	60

	Jan.	Feb.	Mar.	April	May	June
Saranac Lake..	55	46	65	36	41	30
Duluth	65	60	20	50	45	45

The average number of cloudy, rainy or snowy days per month in each place was as follows:

	Jan.	Feb.	Mar.	April	May	June
Saranac Lake..	14	13	13	10	12	11
Duluth	10	9	10	10	11	9

	Jan.	Feb.	Mar.	April	May	June
Saranac Lake..	13	12	10	12	13	14
Duluth	6	8	9	12	13	12

From both tables it is apparent that there is more sunshine in Duluth than at Saranac Lake.

The climate of Duluth and vicinity is thus in many respects similar to that of one of the most famous summer and winter health resorts in the country. The same invigorating elements are present in both localities.

The dry, stimulating, bracing, tonic air of winter; the cool, refreshing nights of summer; sufficient moisture to insure abundant vegetation and keep the air free from dust except in the heart of the city; variety to relieve the monotony of continual sunshine; the presence of forests and beautiful scenery to delight the eye and refresh the mind—all of these elements are decided assets in a health resort where tuberculosis is treated.

As a matter of fact, no climate is characterized by favorable weather conditions all the day and all the year. No climate is entirely good. To live in a highly favorable climate all the time, a person would have to divide his year between different localities, living in one locality at one season and in other localities during other parts of the year.

More important for the patient than the elusive ideal climate are suitable food, abundance of rest and peace of mind, adequate medical care and supervision. While it is undoubtedly true that certain types of chronic bronchitis would be benefited by life in a milder climate than that of Duluth, conditions in this region are suitable and satisfactory for most patients in earlier stages of tuberculosis. Many patients have recovered their health in Saranac Lake and not a few in St. Louis County.

The question of the relation of climate to recovery from tuberculosis is discussed in an article by Assistant Surgeon General Frank of the United States Public Health Service, published as a bulletin for the information of patients. In it we find this significant statement, "No climate can make up for insufficient food, nor for the necessity for working when one should be resting, and least of all make up for the devitalizing effect of homesickness or excessive worry."

Intelligent guidance is the most important factor in the treatment of tuberculosis, and that is one of the factors in the success of the treatment of tuberculosis at Saranac Lake.

Compared with other parts of the country, Duluth has a most excellent climate, and one which may justly be considered one of the greatest assets to this region.

EXPERIMENTS DEVELOPING TECH-
NIQUE FOR THE STUDY OF THE
CHEMISTRY OF NUTRITION
AND GROWTH*

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Minneapolis, Minn.

Chemistry, although claimed to be a pure science, has always been intimately connected with arts, industries, and professions. The origin of chemistry is unknown, but facetious legend tells us that the angels, influenced by women's desires, taught them the divine secrets of chemistry which enabled them to dye their dresses and color their eyebrows.

Chemistry has, during authentic history, been dependent on medicine to a considerable extent. The words alchemy and elixir come from two synonymous Arabic words meaning a catalytic agent capable of transforming baser metals into gold. We now know that metals may transform themselves into other metals, but no catalytic agent has been found to hasten this process, and the transformation is from the rarer metal, radium, into baser metals such as lead.

The great elixir or philosopher's stone was said to be so potent that it could transform a million times its weight of metal into gold, and to cure all diseases and if taken once a month to prolong life indefinitely. Modern ideas of enzymes are quite similar to those of the philosopher's stone. The philosopher's stone was dissolved in a good white wine and the draught taken after midnight. We now have an elixir of enzymes, which is pepsin dissolved in 15 per cent alcohol, to be taken whenever you like. We do not know the chemistry of enzymes and we know the action of enzymes only in certain cases. To say that all chemical processes in the living cells are explained by enzyme action is an evidence of credulity similar to that of the alchemists.

Attempts have been made to show that vitamins are enzymes, but have failed. We do not know the chemistry of vitamins, and in their identification the chemist is dependent on

medicine. The absence of the vitamin is indicated by inanition or sickness in an animal or patient and the presence of the vitamin is indicated by the cure of the disorder. Thus we see that the history of chemical therapeutics repeats itself; we first had the age of the philosopher's stone, later the age of enzymes and now the age of vitamins. Nowadays we associate the idea of the philosopher's stone with fraud, whereas it was the first theory of catalytic processes. Vitamins are similar in theory to the philosopher's stone, since very small quantities are sufficient to produce large changes. Let us hope that the idea of vitamins will be kept free from association with fraud.

It has been known for a long time that diet has an influence on health. The experiments of Lind in 1743 showed clearly that the simple addition of orange or lemon juice to the diet of sailors suffering from scurvy cured them in six days, whereas pure acids had no such effect. Perhaps the most striking experiment was that of Baron Takaki, Inspector General of the Japanese Navy. A disease called beri-beri had been in Japan for a thousand years and had caused a high morbidity rate in the navy. By a simple change of the diet from a preponderating rice diet to a diet similar to that of the navies of the great powers the disease was practically eliminated. It was shown by Eijkmann, who was medical officer in a Dutch prison in Java, that the diet of the prisoners with beri-beri caused neuritis in chickens fed from the table waste. He further showed that these chickens could be cured by an extract of rice bran, and that the prisoners could be cured in the same manner. Shortly afterward Holst and Frohlich showed that scurvy could be produced in the guinea-pig. From this time on numerous experiments have been made in the study of human nutritional diseases by imitating the conditions in animals. Hopkins in England and Osborne and Mendel and Macollum in this country have shown that a substance occurring in butter, cod liver oil and green leaves is necessary for the growth of young animals, and without this substance these animals not only stop growing, but develop ophthalmia. It is now customary to name these hypothetical substances curing ophthalmia, beri-beri and scurvy in the nomenclature of

*From the Laboratory of Physiological Chemistry of the University of Minnesota Medical School.

Funk as the three vitamins A, B, and C. Vitamine A occurs in butter and green leaves, and to a less extent in roots and seeds, but according to Zilva it may be 250 times as concentrated in cod liver oil as it is in butter. Other animal foods are more variable in their content of this vitamine. An animal stores this vitamine in its body when it has a superabundance of it in the diet, and it can grow on a diet free from it until this store is exhausted. A newly weaned rat may have a store of vitamine A sufficient to last three weeks, but a rat weighing 200 grams may have a store sufficient to last three months.

Vitamine B occurs in leaves, seeds and yeast, and to a less extent in roots and in various animal products. It is necessary for growth and is not stored in the body. When the young are fed on a diet lacking it, they fail to grow from the start. After about three weeks starvation in respect to this vitamine paralysis appears and Walerian degeneration affects some of the nerve fibres.

Vitamine C is not necessary for all animals. Guinea-pigs, monkeys and man have the highest demand for it. Rats can live and breed on an amount of this vitamine that cannot be detected in guinea-pig experiments. It is doubtful that the animal body synthesizes any vitamins. The ultimate source seems to be the plants. The liver seems to store vitamins A and C. It contains vitamine B but perhaps not more than is necessary for its own activity.

It was shown by Watson and Fordyce that a diet of lean meat causes changes in the bones of rats such as are described in rickets. Bland Sutton showed that rickets occurred in animal whelps in the Zoological Garden in London if fed on lean meat, and that fat meat cured them of this disease. Mellenby showed that certain diets caused rickets in pups and that rickets was prevented by sufficient quantities of butter-fat and he therefore supposed that vitamine A prevents and cures rickets. He also obtained cures with substances poor in vitamine A but rich in phosphoric acid. Sherman and Pappenheimer produced rickets in rats by total absence of Vitamine A and a deficiency of phosphoric acid. McCollum and Park obtained rickets in rats on diets poor in vitamine A and in phosphoric acid. Some of the diets were said to be slightly deficient in calcium. How-

land found the phosphoric acid content of infants' blood very low in rickets. The simplest hypothesis might be that rickets is due to lowered concentration of phosphoric acid in osteoid tissue. Calcium phosphate is precipitated when the product of the concentrations of calcium and phosphoric acid exceed a certain value. If either the calcium or the phosphoric acid is reduced, failure to precipitate will occur. The lowering of the calcium of the diet causes profound changes not only in the bones but also in the nervous system, and the absence of calcium in the diet is so injurious as to prevent prolonged experimentation. The typical picture of rickets seems to be produced by deficiency of phosphoric acid. It was shown by Dr. Robb in my laboratory that vitamine C causes a loss of calcium from the body. Since Howland has shown low blood phosphoric acid in rickets, and vitamine A seems intimately related with the factors preventing rickets, it seems probable that vitamine A has to do with the phosphoric acid retention just as vitamine C has to do with calcium retention. In both rickets and scurvy the bone calcium phosphate is reduced. Apparently in scurvy it is due to loss of calcium from the body and in rickets primarily to the loss of phosphoric acid.

EXPERIMENTAL

Our first experiment is to determine whether the effect of different diets on the bones of white rats could be determined by means of the x-ray. Rats of about the same age and 30 grams in weight were placed on the following diets: (1) raw lean beef, (2) cooked lean beef, (3) oats with one gram of raw lean beef a day, (4) oats with one gram of cooked lean beef a day, (5) oats and corn meal, (6) oats and soy beans, (7) spinach, wheat flour and milk powder. (Spinach may be substituted by Swiss chard or alfalfa with similar results.) At the end of three months these rats were x-rayed. The accompanying Figure 1 shows rats on diets numbers 6 and 7. It will be noted that the bones in number 7, which is the only adequate diet of the series, are heavier, that is, cast deeper shadows than the bones in number 6, which is typical of the rest of the series. The difference is generalized and no resemblance to human rickets is observed. Hess and Sherman have obtained typical pictures of rickets from the x-rays of rats. In the

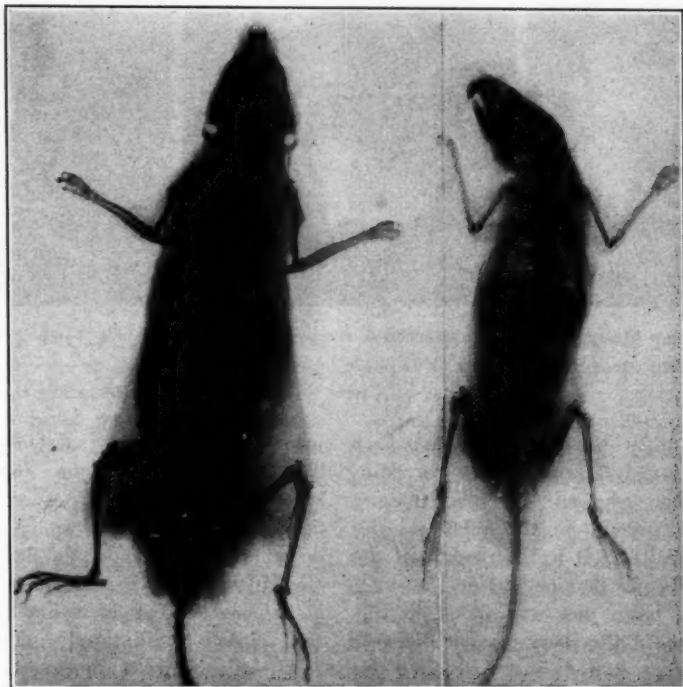


Fig. 1. Radiographs of two rats in Experiment 1. Rat 7 is on the left and Rat 6 on the right.

above rats, calcium determinations were made on the bones, the tibia from one animal on each diet being used. There were no marked differences in the percentage calcium contents of the bones of these animals.

In the second experiment, seven rats of the same litter were fed a basic diet of equal parts of soy bean flour, oat meal, rye flour, cornmeal and four times this amount of wheat flour, and in addition different quantities of milk powder, 2 per cent, 4 per cent, 7 per cent, 10 per cent, 20 per cent, 30 per cent, and 60 per cent. The rat without milk powder died, and in Figure 2 is shown another rat about the same size as this was at death. These rats grew in proportion to the percentage of milk in the diet. After a while, however, all of those with the higher percentage of milk grew up to normal rate and it was only the lowest percentages of the milk that showed a difference in growth. In this experiment not all of the cereal was the whole

cereal; some of it was degerminated and it was decided to use whole grain in another experiment.

In this third experiment oats were fed *ad libitum* and an accurately measured amount of reconstituted milk powder a day was given each rat. The milk powder was mixed with water to form a 12.5 per cent solution and measured in cubic centimeters and fed to another series of rats of the same litter as follows: 4, 6, 8, 10, 12 and 14 c.c. Two other of this same litter were fed buttermilk; one 10 c.c., and the other 20 c.c. These experiments were carried over a period of four months. All these rats had growth curves below normal, which were more marked in those receiving less milk. Calcium determinations on the bones of these animals showed practically no difference, but all had a diminished calcium content.

In the fourth experiment ten rats of the same litter and 30 grams in weight were fed



Fig. 2. Rats in Experiment 2 receiving 0, 4 and 30% milk powder.

on a basic diet of 10 per cent pure casein, 6 per cent sea salt and 84 per cent wheat flour. Control experiments showed that this mixture was adequate in protein in the total calories and in inorganic salts.* It had perhaps half the required quantity of vitamine B but no vitamine A. To this basic diet was added in different percentages in the diets of the different rats as follows: 0, 1, 2, 3, 4, 5, 6, 7, 8 and 9 per cent powdered spinach at the basic diet. At first these rats grew in proportion to the spinach in the diet up to 5 per cent spinach, but those on 6 to 9 per cent spinach did not grow faster than the one on 5 per cent. After they had attained 100 grams in weight, the ones on 4 and 5 per cent spinach grew no faster than the one on three per cent spinach. The one with 0 per cent spinach developed ophthalmia and died. In another experiment we showed that one-tenth of 1 per cent spinach was sufficient to delay ophthalmia and death for ten days. With no vitamine A these young rats usually live only about a month, and yet the small amount of vitamine A in one part in a thousand of spinach is sufficient to tide them over another ten days or so, and the delay in ophthalmia is greater than the delay of death, the animals dying without a very advanced development of ophthalmia. In these experi-

ments pure chemical substances were not fed. The composition of the diet is fairly well known. Cereal diet is deficient in amino-acids, mineral salts and vitamine A. In the case of degerminated cereal, white flour has about half enough vitamine B and no vitamine A. Meat is deficient except in amino-acids. Milk, then, and spinach would supply deficiencies in amino-acids, mineral salts and vitamins where such deficiencies existed. If the vegetable proteins are mixed from a number of different sources, the deficiencies may be supplied. Therefore, in a mixed cereal diet the protein deficiency is not so great as in using one cereal. Soy beans supply adequate protein. In regard to phosphoric acid, it is contained in the mineral matter of many foods and also in certain proteins and lipoids. In case casein is fed, the diet has sufficient phosphoric acid.¹ The sea salts have a very small amount of phosphoric acid and that deficiency could be made up if casein was used in the diet. There is a considerable amount of literature on the effect of phosphorus in rickets, but this seems to be based on a misunderstanding. Phosphorus does not occur in the bones or in the body anywhere. Phosphoric acid, not phosphorus, is the substance which is deposited with calcium in the bones forming calcium phosphate. In case phosphorus is added to cod liver oil the amount is very small, owing to its high toxicity. This phosphorus might be oxidized in the body to phosphoric acid, but the amount would be very small, and therefore of very little therapeutic value. Perhaps it is the attempt to oxidize the

*Further observations showed that all the rats in Experiment 4 had mild rickets. Thirty % casein or 40% spinach furnishes enough phosphoric acid to prevent rickets. The demand for phosphoric acid decreases with growth and healing may occur without change of diet.

phosphorus that kills the patient. Phosphorus poisons the liver, possibly due to its reducing action.

In Experiment 5, eight rats were placed on a diet of pure casein 12 per cent, white flour 60 per cent, pure cane sugar 20 per cent, dried yeast 3 per cent, sodium chloride 2.5 per cent and calcium oxide 2.5 per cent. They also received cod liver oil 0, 2, 3, 4, 5, 6, 7 and 8 drops per week. The technique of feeding these animals was not perfected, as shown by later experiments in which cod liver oil had a marked effect on increase in growth rate. The experiment extended over four and one-half months. Calcium determinations on the tibia of these animals showed a diminished amount of calcium in the bones, being most marked in those that received only small amounts of cod liver oil. Growth curves were all below normal. This is not due to the fact that 8 drops of active samples of cod liver oil a week is insufficient, however, as shown by later experiments.

Experiment 6. In this experiment a litter of six rats were placed all in the same cage and received the same diet, which was 70 per cent white flour, 20 per cent sugar, 3 per cent dried yeast, 2 per cent milk powder, 2.5 per cent sodium chloride and 2.5 per cent calcium oxide. The experiment lasted four months. Growth curves of all these rats were below normal. At the termination of this experiment the animals were divided into two groups and were given a calcium-free diet for five days. After they had been on this diet for two days their urine and

feces were collected over a three day period. The calcium-free diet consisted of hydrogenated fat, sugar, calcium-free filter paper and sodium chloride. In addition the second group of rats received calcium-free butter-fat. The calcium output in the excreta in group 1 of three rats was 11 milligrams, in group 2 of three rats was 10 milligrams. This may have indicated a slightly greater retention of calcium in the bones of the rats receiving butter-fat, which contains vitamin A. These calcium determinations were done by Lyman's method. Better methods have been developed by one of us and these experiments are being continued in regard to phosphoric acid as well as calcium and on diets that produce rickets in rats.

Experiment 7 was made to determine the antiscorbutic action of concentrated orange juice, which was evaporated down to such an extent that it was not attacked by a mold and apparently would keep for a long period. During the evaporation the temperature did not rise above 135° F. The orange juice was reduced to one-sixth of its original volume. Thirteen young guinea-pigs were used, about 160 grams in weight. The basic diet was equal parts by weight of the alfalfa meal and white flour. Ten of these animals also received daily measured amounts of reconstituted orange juice from the above concentrated preparation. Three guinea-pigs received no orange juice. About 1.5 c.c. of fresh orange juice daily will prevent scurvy in guinea-pigs for a long period and although there may be some variation in

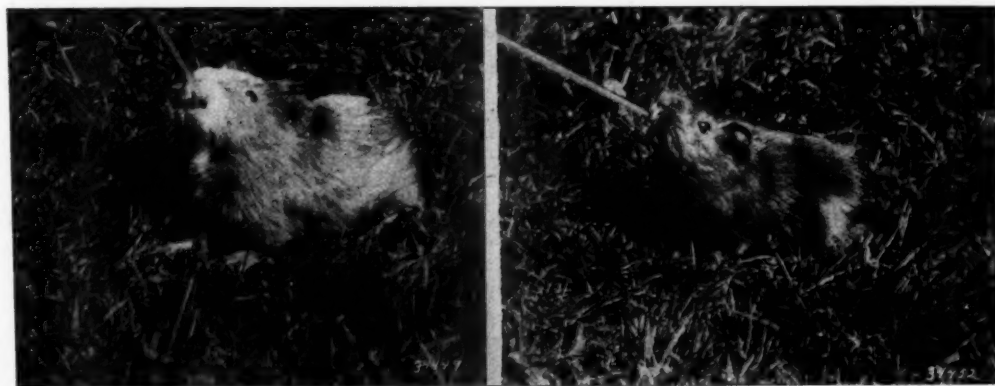


Fig. 3. Guinea pigs in Experiments 7 and 8 drinking reconstituted dried orange juice from a pipette.

oranges this figure is taken in comparison with the reconstituted orange juice. The reconstituted juice made up to the concentration in the fresh orange, that is, about 12.5 per cent of total solids, was fed in the amounts: 0.3, 0.6, 0.9, 1.2, 1.5, 1.8, 2.1, 2.4, 2.7, and 3 c.c. per day, per guinea-pig (fed as in Figure 3). The guinea-pigs receiving no orange juice died of scurvy in 3 weeks. The three receiving the least amount of orange juice developed typical scurvy in about 20 days and lost weight. The other guinea-pigs receiving a large amount of orange juice did not develop scurvy but gained steadily in weight up to the time the experiment was completed and were in a perfectly healthy condition. Their growth curves are shown in Figure 4. In this figure those receiving no orange juice are represented by a single curve number 0. It will be seen in Figure 4 that the growth is proportional more or less to the amount of orange juice. Calcium determinations were made on the teeth but these determinations will be repeated later. Similar results were obtained by McClendon and Shillington on powdered orange juice.

Experiment 8. In this experiment the concentrated orange juice was diluted with a volume of distilled water and then treated with Fuller's earth containing enough calcium carbonate to precipitate the citric acid, filtered with the suction filter and the calcium was precipitated by adding potassium oxalate a few drops at a time and then centrifuging and repeating until no further precipitate remained. Toluol was added as a preservative. This product was fed by means of a pipette as shown in Figure 3, to the extent of 4 c.c. a day to three guinea-pigs that had severe scurvy and were below their original weight. On this treatment they ceased to lose and steadily gained in weight up to the time of closing the experiment. Another guinea-pig that had scurvy and had been cured was placed on a scorbutic diet for one week and was then fed by a pipette 0.75 c.c. of the above product daily for a period of nineteen days and gained in weight. At the end of twenty-six days the experiment closed and the animal was in active state with no signs of scurvy, showing that the anti-scorbutic vitamine had survived this treatment.

In our metabolism experiments with animals we find it saves very much time to have the

diet in dry form. Any quantity of this diet and a single analysis made will suffice for the whole period of feeding. Whereas, if fresh may be prepared and mixed until it is uniform milk was used for feeding an analysis would have to be made each day and if ordinary mixed diets were used analyses would have to be made each meal. In our experiments we make enough of the dried food to last for the whole series of experiments and make one analysis in duplicate. The animals are placed in a metabolism cage with wire screen bottom which sits in a large silica dish, and supplied with distilled water. About enough food for one metabolism period, three days or more, is weighed out carefully and placed in a separate container. If this is a bird-feed receptacle it is attached to the cage. Otherwise only part of the food is transferred to a container and placed in the cage, at one time. In case a tableting machine is at hand the food may be made into tablets which will not fall through the wire screen. In case the food does not suffice, more can easily be weighed out, but all that is weighed out is finally placed in the cage. At the end of the metabolism period all of the food or other matter in the cage, except the animal itself, is shaken down into the silica dish. The mixed excreta and waste food are ashed in this same dish and analyzed. A metabolism balance is gotten by the difference between a certain constituent in the total feed and the mixed waste matter. If there is less in the food than in the combined waste the animal has lost some of that constituent from its body, whereas, if there is more in the food than in the combined waste, the animal has stored up some of that constituent in the body.

It seems desirable to run metabolism experiments on infants in the same manner. The less the number of analyses the greater the accuracy, and therefore if we can prepare a dry diet to be weighed out carefully in the beginning and portions mixed with distilled water at intervals and any portions not consumed by the infant added to the excreta, greater accuracy in the metabolism balance will be obtained. The only difficulty that seems to exist in regard to such experiments is the overcoming of the objections of physicians and mothers to dry diets. The public has been exploited by patent baby

foods and is very suspicious of any dry food. It has been shown, however, in England and also in this country (in Boston) that milk powder is preferable from some standpoints for infant feeding to fresh or pasteurized cow's milk. If mother's milk cannot be obtained, less digestive disturbance may be expected on milk powder than on fresh milk. Whether the superiority of milk powder exists in any individual case or not need not concern us, but if a dry diet can be shown to be equally adequate as compared with a fresh diet it could be used successfully in metabolism experiments. The majority of milk powders are very poor in vitamin C and may give rise to scurvy if not supplemented by anti-scorbutic, but pasteurized milk itself may be deficient in anti-scorbutic and it is always safe to give additional anti-scorbutic. It has been stated that the loss of anti-scorbutic in condensed milk is due to the sterilization after it has been canned, and sweetened condensed milk that contains enough sugar to avoid the necessity of sterilization may contain some anti-scorbutic. Drum-process dry milk is said to contain more anti-scorbutic than spray-process dry milk. However, unless the determination of anti-scorbutic has been made on a particular product it is safer to add more in the form of orange juice or some other food to the diet.

I have tried several dried food preparations on my own infant when two weeks to eight months old with gratifying results, and although this one experiment with no control except another infant born previously and breast-fed may not seem conclusive, I can see no objections to the use of dry diets. The infant that was fed on about half dry diet and half breast milk seems perhaps better nourished than the one on entire breast feeding up to eight months.

The first preparation was 2,000 grams of whole milk powder, 1,250 grams of cream powder, 2,600 grams of lactose, 300 grams of powdered lemon juice, 0.25 grams of sodium iodide and 5 grams of ferric sulphate. This mixture was added to water to make a 12.5 per cent solution and then contained about the average percentage of protein, fat and lactose found in human milk, and in addition a little iron and iodide. When this powder is mixed with water, the lemon juice brings it to about the iso-electric point of the casein ($\text{PH}=4.5$) so the casein

does not dissolve but remains suspended, that is, in a curdled condition. It appears from the studies of Marriott that this may be an advantage. Marriott has shown that cow's milk has a higher buffer value than human milk; that is to say, it requires three times the amount of acid to bring it to $\text{PH}=5$, and therefore it would require three times the amount of gastric juice to cause maximum clotting by rennin. The clotting by acid alone is at a very slightly greater acidity ($\text{PH}=4.5$) but may be different from the clotting by rennin. It is stated that in clotting by rennin the protein is split into two parts. However, if the milk is already clotted by acid before being drunk, the additional acid in the stomach may transform the casein into acid-albuminate, and, according to Brailsford Robertson, a splitting of the protein molecule occurs in this process.

The second milk powder was of practically the same formula, with the exception that orange juice powder was substituted for the lemon juice. The acidity was so high that curdling of the milk occurred here also.

The third mixture was skimmed milk powder to which was added 3 per cent powdered orange juice and 3 per cent powdered spinach. Owing to the removal of the fats the calorific value

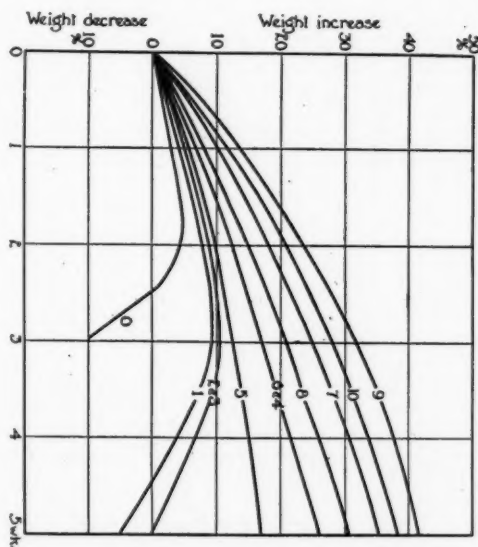


Fig. 4. Growth curves of guinea pigs, 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, fed respectively 0, 0.3, 0.6, 0.9, 1.2, 1.5, 1.8, 2.1, 2.4, 2.7, 3 c.c. of reconstituted orange juice per day.

was reduced so that the concentration should be greater than 12.5 per cent. In fact, one ounce of this powder was dissolved with 5 ounces of water to make the calorific value about equal to that of the average human milk. This mixture is practically fat-free and is high in protein. The vitamin A which is taken out by the removal of the fat is restored by the addition of powdered spinach. Owing to its high casein content and also due to the spinach it is very high in phosphoric acid. The orange juice supplies the vitamin C. This mixture contains more vitamin B than is contained in cow's milk because vitamin B is more concentrated than in the ordinary cow's milk owing to lower water content, and vitamin B is contained in the spinach and the orange juice. It was made fat-free at the suggestion of Doctor Sedgwick for use in case any tolerance for fats was shown by the infant.

We do not exactly understand the chemistry of the fat intolerance. Calcium soap if present in abnormally high percentage in the stools does not indicate any failure of the fat splitting enzyme because such a condition can be produced by a biliary fistula. In fact, calcium soap cannot be formed until free fatty acid is split off. Calcium soap indicates a failure to absorb the fatty acid. Fatty acids are not soluble to any appreciable extent, but are soluble in bile and are absorbed with the bile. This bile that is absorbed with the fatty acids passes through the blood to the liver again and is secreted. The rate of this circulation of the bile varies, however, may be very slow in constipation and more rapid in normal conditions, or sometimes, in diarrhea. Perhaps the cause of the fat in the stools is deficiency in bile and this

deficiency may have the same cause as the constipation. In many deficiency diseases we have a deficiency of digestive secretions and food deficiency may be the real cause of the trouble.

In experiments with these dry diets it is always remembered that breast feeding is the preferable form of infant feeding* and it is not intended to use them as a substitute; but if artificial feeding is necessary, it is of enormous advantage for the study of the chemistry of nutrition to have dry diets. Many changes go on in wet diets, not only due to bacteria but due to decomposition of the more perishable contents by hydrolysis and oxidation. Vitamins and fats may be oxidized and carbohydrates and other substances hydrolyzed and proteins may change their colloidal condition. On dry diets, however, about the only change that has been detected is the oxidation of the fats and that can be prevented by the exclusion of air.

It should be remembered that water is an important constituent of the diet. Marriott claims that dehydration of the body may cause fever. I have observed no ill effect following use of the fat-free diet of lowered water content. The infant should be weighed daily and any loss of weight or failure to make a normal gain should lead to an investigation.

*Provided it is not deficient in any necessary constituent, Bosworth claims that the high calcium content of cows' milk hastens clotting of the milk and that complete clotting is harmful. We do not know the function of clotting. If infants can absorb immune bodies from colostrum they may absorb some unaltered protein, and clotting of the colostrum or early milk might be a safeguard against anaphylaxis. Perhaps the presence of large curds in the stools is the result and not the cause of diarrhea.

ENDOCRINES AND SYMPATHETIC*

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To attempt a paper on endocrinology at a time when the general feeling is so decidedly against it, may seem too daring; yet, after agreeing with the medical profession that its commercial side is a perfect disgrace and that the results thus far obtained through scientific research are rather disheartening, there still remain some very impressive facts.

There are undeniably endocrine diseases as well as endocrine monstrosities; and there are, besides, reliable reports of good effects brought about by endocrine medication.

Criticism, as long as kept within the boundaries of serene, scientific discussion, is most welcome; the *Journal of Endocrinology* is the best example of it; but when the criticism is carried to the extreme of an almost gratuitous slander, it must be called to order, unless we want to see the normal growth of a promising science fatally endangered.

Most criticism is due to our onesidedness, in that only one theory at a time is accepted to the exclusion of the others. This seems to me to be a sad mistake, because a new theory cannot ignore well established facts. As a result the more we progress the wider our theories necessarily become. Through the experience of the past they grow more and more comprehensive and succeed in embracing into larger and better constructed systems many previously narrower ones.

Endocrinology does not try to supplant any other branch of medicine. If anything, it tries to explain physiological and pathological problems, thus far wholly unexplainable. I am confident, that the few established facts that we know of this new science, will, when logically put in their true light, suffice to prove it.

The harmonious interrelation of the endocrine glands and their connection with all the activities of the organism implies also the necessity of a joint discussion of the vegetative nervous system. The endocrine phenomena for the most part expressed through the sympathetic, have their foundation in the nature of chemical action, while the sympathetic nervous system explains, through nerve in-

terrelation, the effect of this primary chemical action upon other organs.

Endocrinology, while perhaps claiming too much, is, by general consent, only allowed a few freaks in the field of pathology; therefore, in regard to these few abnormalities at least, we can consider ourselves on endocrine ground. Let us glance at some of these conditions and see what conclusions can logically be drawn.

First, in order of time, the removal of the thyroid brought us to the understanding of myxedema, which gradually led us to explain cretinism through hypofunction of the thyroid.

On the other hand Graves' disease showed us some aspects of thyroid hyperfunction, which appears in a pure form in the hyperfunctioning adenomatous goiter.

In regard to the pituitary apparatus, acromegaly—in its beginning at least,—gives a full demonstration of hyperfunction of the gland, while Froelich's syndrome is the result of degeneration or hindered action of the pituitary.

The condition brought forth by castration is very well known and there are reliable reports of sexual precocity and exaggerated genital function accompanied by tumors of the testis and of the ovary.

Adenoma of the adrenal cortex is seen to cause, even before puberty, in the male an exaggeration of sexual characteristics, primary as well as secondary, while in the female adiposis is found and a few masculine secondary characteristics.

Addison's disease, which affects the adrenal cortex, either directly or through the sympathetic, creates a condition of general weakness and decay of the organism.

It is rather difficult to find these abnormalities in a pure form, because, owing to the glandular interrelation, the function of the correlated glands naturally comes into play, to complicate the initial picture of these diseased conditions. In spite of this there are enough elements in all of them to demonstrate how the organic effects of hyperfunction or hypofunction are opposed to one another.

Let us take for instance the thyroid gland, which is the best known. The total removal of the gland causes diffuse myxedematous infiltration, dry, cold, thick, yellowish skin, flaccid muscles, decaying teeth, atrophic frail bones, genital impairment, cold sensation, slow pulse and slow metabolism and a severe torpor in all the mental reactions.

*Presented before the Ramsey County Medical Society, St. Paul, Sept. 26, 1921.

Should the thyroid fail in the period of growth, the further skeletal development is prevented, especially the growth in height, the teeth stop growing and so do the skull and the face, while the genital and mental development is brought to a stop.

The opposite picture occurs in case of hyperfunction of the gland. We can logically surmise the existence of intermediate conditions between the two extremes; and actually we are often confronted with people, who, without being true cases of myxedema, offer some signs of the syndrome in a less defined form, slight, sometimes hardly noticeable, yet clear enough to lead us to find the reason in a hypofunction of the thyroid. More than that, a thyroid medication, prudently administered, returns these people to normal.

An analogous, partial, attenuated syndrome in the field of hyperthyroidism is found many a time; and, if we want to go still further, there are a number of cases which offer conditions of hypofunction and hyperfunction at the same time, mixed form, which has been called "unstable thyroidism."

All these belong on a more or less pathologic ground; but, even among healthy people, we find some who show neither syndrome, and yet, on account of their bright eyes, thin, somewhat moist skin, quick mental reaction, slender body and so forth, remind us of a hyperfunctioning thyroid; while, in the opposite field, when there is rather dry skin and hair, somewhat slow pulse, slow mental reaction, decided sensibility to cold and so forth, we are brought to think of thyroid hypofunction. These people are not pathological; perhaps they never will have any accentuated thyroid abnormality; they only form two different types, which in health and in sickness will react in a peculiar way of their own; in short they represent two different "constitutions."

Analogous results will be found in the pituitary field as well as in the field of the gonads, of the adrenal system and so on.

At the first impression this offering back to the medical world the old humoral pathology with its different types, called constitutions, may look rather discouraging; but on further consideration the constitutions, as shown through endocrine light, are so well defined, that they cannot fail to give us a better understanding of the patient and of the way of treating him.

What has been said so far regards pure forms of endocrine disturbances, such as are very seldom

found. Owing to the harmonious interrelation of the several glands, the abnormal functioning of any of them will necessarily allow abnormal functioning of others and consequently offer a more and more complex symptomatology.

A hyperfunction of the pituitary will cause in process of time hypofunction of the gonads (which, by the way, may be preceded by a short period of hyperfunction). This is followed by a hypertrophy of the adrenal cortex and may bring forth exaggeration or even inversion of the secondary sexual characteristics. With late castration signs of hypofunction of the pituitary and hypertrophy of the adrenal cortex appear and signs of thyroidian dysfunction may be detected in either form. Furthermore, it is known that whenever there is a marked insufficiency of either thyroid or pituitary, puberty is either partially or totally prevented, according to the degree of deficient function in these glands.

The most striking instance of interrelation is offered by the adrenal cortex, which appears earlier than the gonads in embryonal life, and whose size is relatively greater at the time of prenatal sexual differentiation, than after birth. Furthermore, pseudo-hermaphroditism is hardly ever seen without abnormality of both adrenal cortexes. In life its size is apt to increase during breeding season in animals, in pregnancy and after castration; it is found increased in acromegaly, and its development is very poor whenever there is a persistent thymus. In its hyperfunction, as brought forth by an adenomatous condition, it seems to favor, in the male, an exaggerated development of sexual characteristics, primary as well as secondary, and in the female, whose sexual organs are less differentiated than the male's from the primary indifferent form, the primary sexual characteristics are checked, while male secondary characteristics and adiposis appear. When, furthermore, we consider that the cortex elements are very similar, if not identical, with the interstitial tissue of the sexual glands, that they both come from the same neighborhood in the mesoderm, and that the cortex is generally smaller in the female than in the male, we are led to think that this gland may form the link between the body and the genital apparatus. This point, though, being only hypothetical, we shall not discuss.

The frequent finding of hypertrophy in a gland, when another is deficient or absent, as happens between pituitary and thyroid, between thyroid and

parathyroid, etc., suggests the possibility of a compensatory hypertrophy, or, in other words, that the hypertrophied glands perform the work of the deficient ones.

In reality there is not always a true hypertrophy; the enlarged thyroid, for instance, often found in acromegaly, is due to increased connective tissue and produces, if anything, myxedematous symptoms. In case of a real hypertrophy, it does not seem to supply the function of the deficient gland. A hypertrophied pituitary with deficient thyroid gives short, thick bones, i. e., pituitary bones, while the hypertrophied thyroid with deficient pituitary gives long, slender bones, i. e., thyroid bones; so that the desired substitution is missed in both cases. More than that, the thyroid acts mostly on epithelial elements, while the pituitary influences the mesoderm in all its manifestations, with a partial exception in regard to the muscular tissue and the genital apparatus, which seem to depend also upon the action of the adrenal cortex. This being true the interrelation is clear, but not the substitution; as, whenever a gland fails, its correlated ones are only allowed a full swing, each strictly in its own field.

The difference in the nature of gland function should also make us discard the thought of any inhibition (a word, by the way, that has more a social, than a natural meaning); as, while all together with a perfect balance work to form a harmonious organism with harmonious functioning, in the dysfunction of some of the glands the work of part of them may become exaggerated, the work of others may be reduced but there is never a cessation of function in any, unless the gland is fully atrophied or has been removed.

The endocrine chemical interrelation might give us the explanation of "homostimulation." The balance in endocrine action must be due to the catabolic principles of the glands brought to one another through circulation. Should one of them fail, the catabolism becomes altered for the other glands, first, and reflexly for the abnormal one. By giving a corresponding normal foreign extract the catabolism would be set right only for the other normal correlated glands first, and through them for the particular abnormal gland, giving it in this way a good help towards recovery.

An instance of apparent failure in this kind of stimulation is found in the spring pregnancy of hogs. Their thyroid is known to undergo some changes during the winter (poverty of iodine and

perhaps other abnormalities which we do not know), and thyroid medication absolutely fails to stimulate the gland. In this condition iodine obtains the desired effect on the general metabolism, yet without inducing any change in the thyroid of the animal. In this case, though, we are dealing with a differently constituted winter gland, on which no effect can be expected from a stimulation, only fit for the usual thyroid.

The good effect of thyroid medication in post-operative myxedema is due, first, to the still satisfactory condition of the other glands; and, second, to the fact, that, on account of the colloid, the medication offered is not a stimulation, but a substitution. The cretin, whose other glands are anything but normal, may show a striking improvement at the beginning of the treatment, only to come to a standstill later on. This is so true, that many a time no improvement can be even started, unless a pluriglandular treatment is given.

Thus far the endocrine system has been shown only in regard to the constitutional changes induced in the organism, while nothing has been said of the nerve interrelation. Let us try to see the behavior of the endocrines in the changes brought forth by the external and internal influence, acting through the nervous system.

To throw some light on the subject it is indispensable to know what is meant by a nervous action, and then to study its play in connection with the aforesaid influence.

Let us start with the "gastrula," in which the interrelation between the layers will be accomplished by chemical action, as it is generally agreed in regard to indifferentiated organisms.

When this primordial formation begins to grow differentially into the several ectodermic and endodermic organs, the relation of continuity between the layers becomes interrupted by the independent growth of the external and the internal layers in respect to each other. The mesoderm will take care of it, as also of the tissue of support within the organs, thus severing their components from one another, with the result of rendering apparently nil the direct chemical action, as understood in the simple, primitive cell.

Owing to this change the chemical action, if it has to work at all, must in its turn follow the differentiated growth of the organism and become concentrated and specialized. Such would be the origin of the endocrine glands. In this connection the function of interrelation is taken up by a

new element, the nervous system. At this moment begins the wonderful task of an apparatus, which will respond, from now on, to every new organic need with a new corresponding association.

Embryonally there is only one nerve apparatus, but functionally speaking we can actually think of three different systems. First, of course is the cerebro-spinal system, to put us in connection through action and reaction with the external world. This, however, cannot by itself provide food. Second, the slow visceral system (due to emigration of cells from the first), which shows a decided autonomy of action, and finally the sympathetic system, which forms a link between the two others.

The famous experiments of Goltz and Ewald would imply that the functioning of the visceral system is wholly accomplished by the sympathetic; yet, when we remember that the excitors of the sympathetic come all from the cord and the afferent branches all go back to it, I cannot see how a sympathetic, severed from its centers, may still retain any valuable power of control over any apparatus. At the most we might suppose that, through the isolated sympathetic, correlation is preserved between the various viscera, otherwise autonomic.

The striking difference in the function of our organs, some specialized for the vegetative life (anabolic) and others for the animal life (catabolic) has led us to surmise the necessity of a new special function—the trophism—and of the consequent existence of trophic nerves, as nerves are the only link to be found between anabolic and catabolic organs. The disagreement still existing in this field may justify a few considerations on the subject.

Our having a time for eating and another for working has made us feel, that these are two widely independent functions. In spite of this belief we all know that a muscle kept too long at rest loses much of its size and power. We know that in cerebral hemiplegia there is some loss of muscular tissue, yet not a complete one thanks to the "tonus" still preserved in the paralyzed muscle, while spinal destruction is followed by flaccid paralysis with gradual, total loss of contractile tissue. It is common knowledge that a well understood training of the body as well as of the mind brings forth a well balanced development.

On the other hand we know that functioning of any organ or part of it is accompanied by an increased flux of blood. That the function of the blood in the nutrition of the cells is an established

fact; so that it does not seem so unreasonable to surmise that the nutrition of the cell is determined by its functioning.

I insist on this point, because, once we rule out the function of trophism (as a function per se) it will be easier to understand the significance of the nerves. There is not a single activity of the body that is not performed either by a gland or by a muscle; the nervous system, though in connection with all the muscles and all the glands, does not create any function, but through its faculty of feeling the impulses and transmitting them in the form of stimulation, to where they belong, it utilizes them all, according to external or internal influence and to the consequent demand on this or that organ or function.

The psychic element, whose connections with the physical field is so close that no satisfactory line of division can be drawn, remains.

In spite of any idealistic theory, our only way of grasping the phenomena is to compare them with one another through the exclusive knowledge of our sense organs; so that our consciousness comes to be the feeling of the interrelation between our sense impressions. More than that, there is no way of conveying the conception of "sounds" to the deaf mute, or the conception of "light" to a blind born. The memory itself, this wonderful form of reflex sensibility, is so much a matter of nerve association, as to be broken by the mere destruction of a few nerve fibres (the verbal blindness illustrates the assertion).

Should we analyze language (the only true historian of mankind) we would find that there is not one word, that has not, at least originally, been taken from physical phenomena. The verbs express our way of feeling or of acting, the nouns are either referred to material objects, or,—like the Christian names—to some peculiarity of the body or of its activities, the adjectives correspond to the differentiated capacity of our sense organs and so on. By completing this crude scheme by adding all the metaphorical elements which our faculty of comparing and social intercourse have brought into play, we would still find that there is nothing in our minds beyond our senses.

Far from any intention of depreciating the mental faculties, I only intend to convey the idea, that, once the brain work of association is well understood, we do not need to add a superfluous element (the psychic) to increase the intricacies of the already rather complicated human problem.

After the hasty survey of the nervous system according to which sensibility, stimulation and association can fully explain all its functioning, we must realize that the ruling factor in our changes is found in the cellular metabolism, as especially determined by the highly differentiated principles, which constitute the endocrine glands.

Taking for an instance the total removal of the thyroid, whose effects are well known to us all, we may state that whatever following change is detected in the organism is exclusively due to the absence of the gland. Again, we can see that from the skin to the vegetative and genital apparatus to the nervous system and to the psychic field, every one of them undergoes the most striking change; and, finally, that notwithstanding a universal syndrome, which implies decided abnormalities in every system of the body, the mere administration

of thyroid suffices to return everything to normal.

Summing up we may infer, that the external world determines a condition of continuous variations, temporary as well as permanent, in our organism, from which none of the elements is totally excluded. The phenomenon—in our differentiated development—is rendered possible through the action of the nervous system, which links together all our organs and functions. Of course, any abnormal change or disease of any organ or in the connecting apparatus is apt to injure the interrelation in a more or less accentuated way, to the detriment of the organism.

The faculty, however, of reacting to external or internal influence—in our present condition not any less than in the monocellular organism—is obtained through chemical action, which is the role of the endocrine system.

CLINICAL ASPECT OF A FEW DEVELOPMENTAL VARIATIONS*

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The carpal scaphoid varies greatly in size and shape. It is a boat-shaped bone situated on the radial side of the carpus, and articulates with the radius proximally, the greater and lesser multangular bones distally, and capitate and lunate bones medially. It arises embryologically from a single group of cells, although von Bardeleben has noted its origin from a double cartilaginous center. Ossification begins about the sixth year from a single center.

As Pfitzner has shown, the bone is composed of two originally distinct elements, a radial and an ulnar scaphoid. These unite early, and it is rare to find them separate at birth, union having usually occurred before this time. Frequently the union is not complete, and we have a partially divided scaphoid, in which the two halves are either only partially united or in which the concave surface is deeply grooved below the dorsum. Rarely the bone is found completely divided, with cartilage occupying the space between the two elements. When this condition occurs, as Pfitzner has pointed out, the line of division usually runs from the outer end of the articular surface for the radius to the middle of the concavity for the head of the os magnum.

The radical externum and the centrale, although closely associated with the form and development of the scaphoid, are not here under discussion.

In regard to this carpal variation Dwight says:

"It must be freely admitted that the great majority of specimens of subdivided scaphoid have a very pathological appearance. Pfitzner is very nearly at the point of denying the occurrence of fracture in any of these cases. I think this is going too far, for the history of lesion is often very precise, and I do not doubt that an undivided scaphoid may be broken. Pfitzner argues very convincingly that a subdivided scaphoid is not a good mechanical arrangement, that the pieces playing one on the other become displaced, that the cartilage degenerates, the surfaces become eburnated, and finally signs of inflammation appear marked by the formation of irregular pieces of bone. To this I would add that a subdivided scaphoid is no



Fig. 1. Congenitally divided scaphoid. (Right hand)

charm against the accidents to which all are liable. On the contrary it makes a slight injury the more serious, as such a scaphoid may be lacerated by violence which would not have broken a normal bone. I am far from questioning the diagnosis in many cases of fracture of the scaphoid. I do not deny that a normal bone may be broken, but I strongly suspect that in most cases called fractures there was a subdivided bone to begin with."

Figures 1 and 2 represent the right and left hands, respectively, of a patient who complained of weakness of the hands. From a radiographic examination the condition was diagnosed (outside of the Public Health Service) as a bilateral fracture of the scaphoid. The patient claimed to have fallen face downward and struck both wrists on the floor. There was a little pain, no swelling, no redness, practically nothing but the subjective weakness of the hands.

On close observation it will be seen that the scaphoid in Figure 1 shows no evidence of reaction to an injury. The line of division between the two halves of the bone is smooth and clean-



Fig. 2. Condition of congenitally divided scaphoid following injury. (Left hand)

cut. There is no callus or new bone formation surrounding the division. In other words there is no evidence of an injury having taken place. The scaphoid is congenitally divided into radial and ulnar halves.

Figure 2, on the other hand, shows the division between the two halves of the scaphoid to be irregular as if the cartilage had degenerated, signs of inflammation are present, the new bone formation being in irregular pieces.

What inference is to be drawn from a study of this case? In the first place the actual occurrence of a scaphoidal fracture is a debated question, at least fracture of a normal scaphoid. But here we have a bilateral division of the scaphoid. One scaphoid clearly shows the results of an injury. The other appears to be quite normal, except for the division into two halves. Only a failure to appreciate the history of the development of the human hand from the foreleg of the lower animals, plus an active imagination, can result in the conclusion that there is a bilateral fracture of the

scaphoid when even the question of a true fracture of the scaphoid is under discussion. The most rational explanation is that there is a congenital bilateral division of the scaphoid into ulnar and radial halves.

The patient went along nicely through life until a slight injury to the left wrist gave him a little pain and a feeling of weakness in the joint. A roentgenological examination of both wrists showed the condition to be bilateral. The patient, then, knowing that the condition was bilateral, and being told that the scaphoids were fractured, complained of weakness in both hands. Undoubtedly the left wrist joint is giving him some trouble. The congenitally weak union between the radial and ulnar scaphoids has become still more weakened, the cartilage has degenerated and inflammatory signs are present with irregular new bone formation. The patient is having trouble not only on account of an injury, which probably was slight, but mainly because of a congenital handicap. The right scaphoid is mechanically weak. A slight injury will separate the two halves completely, or the cartilage will degenerate and an inflammatory condition result. Such a congenitally weak joint should be protected as much as possible from injury.

The human pre-hallux (tibiale externum) is a supernumerary bone of the foot discovered by Bauhin in 1605, and has been known since the time of Luschka under the name of tibiale externum. This ossicle occurs in about ten per cent of all feet. When it does occur in the majority of cases it is bilateral. It is found with great frequency in the lower animals and there is no doubt it is an ossicle which is slowly, but surely, dropping out of the human foot. Monahan takes a peculiar stand in regard to the supernumerary ossicles, especially with reference to the tibiale externum. He says:

"The pre-hallux in human feet has two possible interpretations: (1) It may be regarded as an evidence of diseased and degenerate feet whose degeneracy allows old and once-atrophied structures to redevelop; or (2) it may be looked upon as Nature's normal and healthy effort to brace a rapidly abducting member and adjust it to its ever-increasing responsibility. Thus it is an open question whether the human pre-hallux is a revision to a lower ancestral form or whether it represents a further stage in evolution and foreshadows a future, normally six-toed human foot.

"If the first interpretation is correct the pre-hallux should appear only in association with some degener-

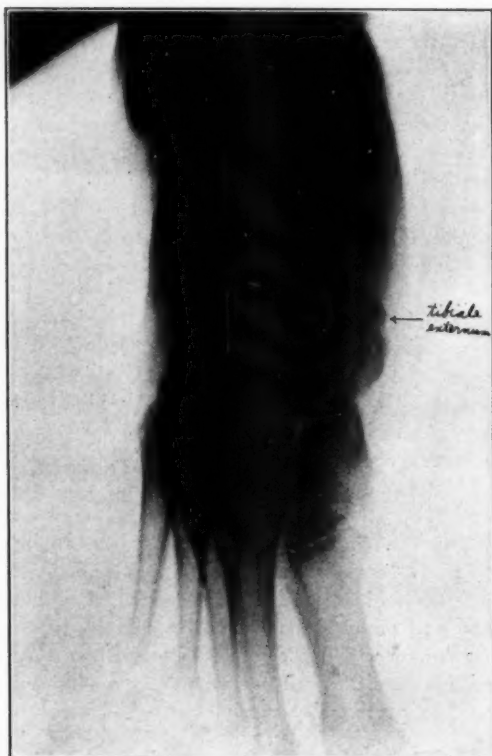


Fig. 3. Tibiale externum.

ating disease, a history of which, by sufficient thoroughness of investigation could be obtained. If the second is correct the pre-hallux-bearing foot should be a healthy, normal member, the advance agent of a more efficient human foot-type.

"Again, if the first hypothesis is correct we should be able to find traces of the old 'ancestral form' among the direct ancestors of the human foot, and, according to the teachings of convergent evolution, they may appear among the members of other orders and other groups as well. That these traces exist in ample measure is shown by the animal series that follows. If the second hypothesis is correct, the pre-hallux, as Nature's adjustment of individual form to function, should appear only when a similar function makes necessary a similar adjustment. Since man is the only animal who has so far perverted his feet as to make them inadequate to the duties imposed upon them, we should, in this latter case, expect to see the pre-hallux only in human feet.

"My observation of pathological conditions coexistent with the pre-hallux, as well as my original researches among the foot structures of lower vertebrates, lead me to incline toward the former theory, namely, that the human pre-hallux signifies reversion to lower form, brought about probably by constitutional disease."

To begin with, it is news to the human race that "man has so far perverted his feet as to make them inadequate to the duties imposed on them." To most embryologists the human foot is constantly becoming more adapted to the tasks imposed on it. The modern conception of evolution is that progress is always being made toward greater efficiency, and not the reverse, and the presence of the tibiale externum in the human foot can not be regarded "as an evidence of diseased and degenerate feet whose degeneracy allows old and once-atrophied structures to redevelop."

In a dissection of a number of hylobates syndactylus, Kohlbrugge found that the pre-hallux articulates between the first metatarsal and the internal cuneiform (nine cases). In one hylobates syndactylus the pre-hallux was apparently fused with the metatarsal, appearing to be, consequently, part of a true tarsal bone. It would seem, therefore, that in *H. syndactylus*, the position of the pre-hallux is about the same as in the kinkajou. The finding of the bone in a divided condition by



Fig. 4. Tibiale externum.

Pfizzner serves to still further confirm the theory that it is part of a ray that is dropping out of the foot of many animals as well as man.

Figure 3 shows the injured foot of a veteran in which the tibiale externum is well developed. It does seem strange that this ossicle should develop coincident with disuse due to injury.

Figure 4 shows a perfectly normal, healthy foot of a young adult. This boy at no time has complained of any foot trouble. It would certainly require a wonderfully active imagination to conclude that he has "diseased and degenerate feet" merely because of the presence of a normal supernumerary ossicle. From the intensive study made of the supernumerary bones of the hands and feet by Pfizzner, Dwight, and others, there is but one conclusion that can be drawn of their presence. They are not developed to meet certain physical requirements of the adult. This is evidenced by the fact that they are present as cartilaginous nodules in the fetus and in greater numbers than in the adult. According to Thilenius they are to be regarded as integral parts of the skeleton phylogenetically inherited.

The triangulare, as figured by Pfizzner, lies between the radius and ulna above and the semilunar and cuneiform below, distal to the triangular cartilage. It is one of the rarest of the supernumerary carpal bones, although Thilenius found it in sixty-five percent in the second month of embryonic life.

Owing to its rarity it is not of great clinical importance, but in dealing with injuries of the hand and wrist it must be kept in mind that the ossicle occurs in this position, and must be differentiated from a fracture.

Figure 5 shows a smooth, oval ossicle distal to the styloid process of the ulna. There is no history of an injury or other cause of a pathological condition of the wrist. The radiograph was taken merely for comparison with the other wrist. There can then be but one inference, namely that this ossicle is a small, supernumerary bone, the triangulare.

For comparison, Figure 6 shows an injured wrist with a fracture of the ulnar styloid. The fragment lies above the triangular ligament in close opposition to the ulna. It is too high to be a triangulare, and in view of its appearance and the history of an injury, there is no difficulty in making the diagnosis. Difficulty in interpretation will arise only when there is a history of an injury,



Fig. 5. Normal hand showing triangulare.

with a bone lying below the triangular ligament. Then it will be necessary to make the differential diagnosis between a secondary pisiform, triangulare, and fracture; a very difficult situation.

CONCLUSIONS

Fracture of a normal scaphoid is a very unusual occurrence.

Most scaphoidal fractures are superimposed on an imperfectly developed bone, usually one which is already partially divided.

The tibiale externum (pre-hallux) is probably the reappearance of one of the bones of a ray of the foot which has not finally dropped out.

The tibiale externum is not developed as the result of a pathological condition of the foot.

The triangulare is rarely seen, but it can be differentiated from a fracture by the history, appearance and position of the ossicle.

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Fig. 6. Fracture of ulnar styloid.

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GOITER SURGERY*

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In no other branch of surgery has there been the marked advancement, with such phenomenal reduction in mortality rate as in surgery of the thyroid gland. It is perhaps safe to say that the last decade has witnessed more actual progress in the study of thyroid disorders than has all of the time intervening since Parry first described exophthalmic goiter in 1786.

About a half century ago Gross, (quoted by Halsted and Frasier) in giving his opinion of the surgeon who might attempt the removal of a goiter, wrote as follows: "Every step he takes will be environed with difficulty, every stroke of his knife will be followed by a torrent of blood, and lucky will it be for him if his victim live long enough to enable him to finish his horrible butchery. Thus, whether we view this operation in relation to the difficulties which must necessarily attend its resection, or with reference to the severity of the subsequent inflammation, it is equally deserving of rebuke and condemnation. No honest and sensible surgeon, it seems to me, would ever engage in it."

In the March, 1921, issue, "Surgery, Gynecology and Obstetrics," Crile, reported an unbroken series of 461 thyroidectomies and litigations without a death.

Comparing these views of fifty years ago with the facts of today, one is inclined to ask, what, if any, one factor was most concerned in making such improvements possible. In a careful review of the literature one finds the answer. Everywhere the names of Kocker, C. H. Mayo and Crile stand out prominently. It is to these masters, together with such men as Mobius, Marine, Wilson, Plummer and Kendall that the goiter world of today owes its greatest debt. Through the effort of these workers the operative mortality in all types of goiter requiring operation has been reduced to less than 2 per cent. The problem which confronts us as average surgeons is how are we to keep within these limits.

With increased experience one comes to realize more and more that goiter surgery differs from

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that of almost any other branch, in that we have here a condition which may assume one of several types; each of which require separate and special consideration. With our present conception of goiter it would seem that a thorough understanding of these various types is of first importance. When thus familiar, and not until then, one has a working basis for the study of thyroid disorders.

For clinical study, i. e., for preoperative diagnosis, also as a basis for treatment, goiters can be divided into the following groups: I, simple or colloid goiter; II, simple adenoma; III, toxic adenoma; IV, exophthalmic goiter.

Take the patient as she first appears at our office. If under the age of maturity, say from 14 to 20, it is reasonably safe to assume that she has a so-called adolescent goiter. Enlarged thyroids coming under this term are usually diffuse colloid, may be adenomatous or a combination of the two, the colloid almost always predominating. It is a well known fact that goiters of this type often disappear spontaneously or respond readily to medical treatment. Marine has shown that goiter of the adolescent type can be prevented by the administration of iodine and that this type, when fully developed, can often be cured by the same treatment. Surgery is indicated in these cases, only, when internal medication has failed and the gland continues to enlarge to a point where pressure from the tumor causes marked discomfort. Occasionally a condition of true hyperthyroidism develops in this type of goiter. Whether this is due to hyper-function of the adenomatous areas, in the mixed type, or an over secretion of the surrounding gland tissue, as a result of stimulation (possibly by the colloid) is not definitely known.

Another group of symptoms closely resembling those of hyperthyroidism sometimes appears in this type of goiter; this syndrome, perhaps the least understood of all thyroid conditions, is apparently not due to over-secretion of the thyroid hormone, but is caused, according to some investigators, by absorption of the products of degeneration. The patients in this group present nervous manifestations similar to those of hyperthyroidism, but the nervousness differs from the latter, in that it is more like that found in the psychoneurotic person with tremor and tachycardia. The basal metabolic rate is normal. Cases of this type can often be cured by medical treatment.

If our patient is beyond the adolescent period, we may expect to find any one of the conditions

coming under groups II, III and IV. Occasionally a pure colloid goiter will continue into adult life; more often however, there is a combination of colloid and adenoma. It is estimated that 40 per cent of all simple adenoma become toxic sometime during the life of the patient. (Judd.)

Simple adenomas occur at almost any time of life but usually make their first appearance during the third or fourth decade. Plummer is of the opinion that the majority of adenomas have their inception in colloid goiter. Lending weight to this theory is the fact that clinically adenomas often begin during, or closely following, the latter part of the adolescent period, which is within the time that the colloid goiter not infrequently disappears spontaneously. It seems possible that stimulation of the surrounding thyroid tissue by the colloid may excite the formation of new adenomatous tissue. If this theory has any foundation, one might assume that the new adenomatous tissue thus formed takes the place of the colloid as the latter is absorbed.

Clinically, adenomas usually cause a more or less uniform enlargement of both lobes. If one lobe is much larger, there is apt to be a cystic degeneration of colloid or adenomatous areas. Because goiters of this type are not usually disabling, it is at times somewhat difficult for the conscientious surgeon to decide on the treatment to advise.

Since colloid goiter can usually be cured by medical treatment, because this type sometimes occurs during adult life, and because it is often impossible to differentiate clinically between colloid and adenomatous goiter, particularly the mixed type, it would seem only fair to the patient to defer surgery in early adenomatous goiter until medical treatment has had a fair trial. On the other hand, when we consider the fact that 40 per cent of all simple adenomas become toxic sometime during the life of the patient, that perhaps 20 per cent more suffer from pressure or other discomforts, that all are more or less disfiguring and that the operative mortality in this type is practically nil, it would seem that our internist colleagues might withhold censure, if perchance we operate upon a case that possibly could have reached the end of her allotted three score years and ten without a thyroidectomy.

For many years a form of goiter with symptom complex similar to the exophthalmic type was recognized by clinicians. Although differing somewhat from the true Basedow's disease, particularly

by the absence of exophthalmos it was nevertheless considered and described by many as an atypical or incomplete form of exophthalmic goiter. While admitting that the symptoms were similar, that the toxicity in each condition was probably due to alternation or over-production of the thyroid secretion, and that results from the same treatment were almost equally good in both, a few of the more careful observers were unwilling to accept the so-called false goiter as an atypical or aberrant form of what had long been known as true exophthalmic goiter.

In 1911 and 1912, Plummer, after careful investigation of a large number of cases, showed conclusively that the two syndromes differed from each other, not alone in some of the essential symptoms but also that the pathology in the two conditions is not the same. He called attention to the fact that the exophthalmos, present in the majority of cases of true Basedow's disease, is rarely if ever found in the other; that the gastro-intestinal disturbances often occurring in the true exophthalmic goiter seldom appear in the false and that there is a distinct tendency to hypertension in the atypical form which is unusual in exophthalmic goiter. In true exophthalmic goiter, there is diffuse parenchymatous hypertrophy and hyperplasia while in the atypical form there is hypertrophy, but the pathologic changes are confined to new growths or adenomas in the gland. Rarely there is both clinical and pathological evidence of toxic adenoma and exophthalmic goiter in the same patient at the same time.

Correlating the clinical and pathologic findings of these two syndromes separately, it was clearly demonstrated that they represented two distinct types of toxic goiter; one the true exophthalmic goiter, the other the thyrotoxic adenoma. With the identity of toxic adenoma thus established, Plummer sought to show the clinical and pathological relationship of all types of goiter by dividing them into four groups: I, non-hyperplastic atoxic; II, non-hyperplastic toxic; III, hyperplastic atoxic; IV, hyperplastic toxic. While this classification is more comprehensive, it seems that for clinical purposes the simpler one used by the writer is preferable.

Surgical treatment of goiter should be considered from the standpoint of: (1) Diagnosis; (2) Pre-operative treatment; (3) Anesthesia; (4) Operative technic; (5) After-treatment.

Confronted with a patient, presenting an en-

larged thyroid, it is of paramount importance to determine the type of goiter from which she is suffering. In the absence of complicating phenomena, such as are indicative of thyroid toxemia, one may assume that she has a colloid goiter or simple adenoma. If, however, there are nervous manifestations and perhaps other indications of toxicity, we must at once consider the possibility of exophthalmic goiter or toxic ednoma; here the goiter may be large or small and occasionally in exophthalmic goiter there is no palpable tumor; in these types, particularly exophthalmic goiter the patient seldom refers to her goiter as the possible cause of her discomfort; the eyes are bright, there is often a flush, which in the early stages may be mistaken for indication of good health; she is animated, has full confidence in her strength and believes herself physically entirely well. To the careless observer or to one inexperienced in thyroid conditions, the above, rather ill-defined symptoms are apt to be misleading and may be a stumbling block in the way of correct diagnosis. If, however, the examination is carried to a point beyond mere observation one will invariably find unmistakable evidences of hyperthyroidism; together with those indicated above they are exophthalmos, nervousness, tremor, loss of strength, (particularly in the extensor muscles,) loss of weight, gastro-intestinal disturbances, increased appetite, vasomotor disturbances, palpitation, tachycardia and later myocardial degeneration. Any or all of these symptoms may be present, depending on the degree of toxicity, and the stage of the disease.

The differential diagnosis between exophthalmic goiter and toxic adenoma has been previously considered; but to recapitulate briefly; exophthalmos is present in about four out of five late cases of exophthalmic goiter and rarely if ever in toxic adenoma. Gastro-intestinal disturbances which are often present in exophthalmic goiter are not so apt to occur in toxic adenoma, and hypertension which is usually present in some degree in toxic adenoma is seldom found in exophthalmic goiter. Basal metabolism, while always increased in toxic adenoma is not usually as high as in exophthalmic goiter; acute crises are not so apt to occur in toxic adenoma as in exophthalmic goiter. C. H. Mayo, quoting Plummer, states that "enlargement of the thyroid was noted from five to ten years earlier in life by the patients with non-hyperplastic goiter than by the patients with hyperplastic (exophthalmic) goiter; in cases of exophthalmic goiter the symp-

toms of hyperthyroidism followed the appearance of the goiter with an average of nine-tenths of a year, while in cases of non-hyperplastic adenoma with hyperthyroidism an average of fourteen and one-half years elapsed before the symptoms of hyperthyroidism appeared." The syndrome referred to under colloid goiter, which is thought to be due to the absorption of the products of degeneration and which is amenable to medical treatment, must not be overlooked in its true form and mistaken for exophthalmic goiter or toxic adenoma. One must also remember that there is a condition resembling acute hyperthyroidism which is caused by the ingestion of thyroid extract or iodine; this "artificial Basedow's" gradually disappears after the cause is removed.

The scope of this paper does not permit a detailed discussion of the various diagnostic tests used to determine the presence or degree of toxicity. This phase of the subject, particularly basal metabolism, has been so thoroughly discussed in recent papers by Plummer, Benedict, Lusk, Boothby, Means and Du Bois* that it would be superfluous for one of less experience to attempt to add anything at this time. Suffice to say that in our work, basal metabolism has been of inestimable value, both as a means of differential diagnosis in obscure cases and as an aid in determining the degree of toxicity.

The Goetsch or epinephrin test has been so variable in its action that we no longer use it as a routine. In connection with positive clinical signs and increased basal metabolism, it is partially confirmatory, but alone is unreliable.

Lymphocytosis as pointed out by Kocher, no doubt bears some relationship to the degree of toxicity, but on account of the same blood picture appearing in other thyroid conditions this test has only relative value.

We have not had sufficient experience with the other tests to venture an opinion.

While we would feel badly handicapped if obliged to do goiter surgery without the aid of these tests, particularly basal metabolism, we nevertheless fully agree with Crile when he states that "the most important points are taking a careful history and making a careful physical examination. After that the basal metabolism rate is of great importance, but I would not regard it as being of pathognomonic importance, nor would I classify

exophthalmic goiter only on basal metabolism rate. We feel that the best guide, after all, is the judgment of the surgeon or physician. The basal metabolic rate will tell you what rate of expenditure the body is making, but it does not tell you how much reserve there is in the myocardium, in the liver and the central nervous system."

Preparatory treatment is second only, in importance, to diagnosis; here the condition, of course, and the habits of the individual patient must be considered. Non-toxic goiter patients when otherwise physically well need no special preparation and can usually be operated upon with safety the day following admission to the hospital. Toxic goiter patients should never be operated at once, but must be kept under observation and treatment for an indefinite period, varying from days to months, the time depending on the improvement. The question of medication and other means of treatment have been much discussed, with no definite conclusion. Quinine, ergotine, bromides, belladonna, digitalis and other drugs all have their advocates. X-ray has had extensive trial, with questionable results. When all is said and done, absolute rest in bed, freedom from excitement and worry, confidence in the attendants, with digitalis to bolster up the failing heart and other drugs as indicated, comprise a treatment, which, if continued long enough, will usually bring results. Occasionally, however, there is not sufficient improvement to permit a primary thyroidectomy. The nervousness does not subside, the pulse remains rapid, basal metabolism continues high; in fact the picture of a high degree of toxicity remains. Here the question of ligation of the superior thyroid arteries presents itself, and here again a question of good judgment on the part of the surgeon. Basal metabolism is often a reliable guide in the course to pursue; it is a fairly safe rule to ligate when the basal metabolic rate is above plus 50; it is not safe, however, to rely wholly on basal metabolism, for occasionally the rate may be low and yet a primary thyroidectomy would be dangerous. We all remember the old rule in abdominal surgery, "when in doubt drain." This rule changed to read, when in doubt ligate, cannot carry one far amiss in goiter surgery. Thyroidectomy should never be done during an acute exacerbation in exophthalmic goiter.

Indications for surgical treatment of colloid goiter needs no further consideration. Simple adenoma in the early stages should be given a trial

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with medical treatment. If, after a reasonable length of time there is no relief, or, if of long standing, in the absence of complications the removal of the gland is largely a matter of choice with the patient. When the tumor causes discomfort through pressure or on account of the weight, a thyroidectomy should be advised. Judd states that "thyroidectomy will cure more than 65 per cent of patients with the more severe types of thyroidism (exophthalmic goiter), and that more than 80 per cent of the patients with adenoma with hyperthyroidism can be relieved of their toxic symptoms and a cure obtained by thyroidectomy." He adds that a higher percentage of cures would undoubtedly be obtained if the cases received proper attention sooner and were operated earlier. Judging from our own limited experience, we believe Judd's estimate of cures is rather too conservative. At any rate the results are too striking to require further argument in favor of surgery, as compared with continued medical treatment.

The veritable mountains of literature on anesthesia in goiter surgery, which has appeared in the last few years, is convincing evidence that this question is far from settled. In some clinics ether is used exclusively, in others local anesthesia has the preference and in still others nitrous oxide is the favorite; and again, there are advocates of a combination, as local anesthesia and nitrous oxide. We have no quarrel with any of these contenders so long as the anesthetic used is the best and safest that the particular surroundings will permit. For example, if one has an anesthesiologist who is skilled in the administration of ether, and ether alone, then ether is the safest. In certain conditions, as diabetes and other debilitating diseases, in the absence of extreme nervousness, local anesthesia is the anesthetic of choice; but with an expert in nitrous oxide anesthesia, the latter is, in the writer's opinion, by long odds the safest and most desirable in every way. We have used nitrous oxide exclusively in goiter work for the past six years and are more than satisfied with the results. We give a hypodermic of morphine gr. 1/4 and atrophine gr. 1/100, one-half to one hour before the patient is brought to the operating room. Nitrous oxide anesthesia; as the anesthetic is discontinued morphine gr. 1/6 hypodermic. The patient leaves the operating room wide awake, and almost always greets us with a smile when making the rounds after the morning's work. The average time in the hospital after the operation is six days.

Operative technic is what the individual surgeon makes it. To follow hard and fast rules laid down by some one else, would, to say the least, preclude the best results in all cases. A successful technic in goiter surgery can only be gained by close observation and experience. With this fact in mind only a few minor points which strike us as being important will be mentioned. In our work the Balfour technic has the preference, with such modifications, of course, as the individual case requires. A primary division of the isthmus is made when conveniently possible, turning the lobe outward, we believe there is less danger of injury to the trachea and the recurrent laryngeal nerve by this method, and that bleeding can be better controlled. Excepting large cysts which are limited to one side we always do a partial resection of both lobes. We rarely cut the sternohyoid and sternothyroid muscles. We have never had a case where it seemed that too much thyroid tissue had been removed. Particular attention is paid to hemostasis; the patient is allowed to become partially awake (from nitrous oxide) after all bleeding is thought to be controlled; the strain while awakening will cause bleeding from any vessels not properly secured. Drainage is provided by a double split rubber tube; i. e., the tube, of any size desired, is split on both sides about one and one half inch. One lip of this tube is placed down to the trachea or goiter bed; the muscles are then united over the trachea, and the other lip of the tube placed between these muscles, behind, and the platysma and skin in front; the intact end of the tube, about three-fourths inches in length, is brought out through a stab wound in the center, below the incision. The goiter bed and the space between the ribbon muscles and the platysma are thus drained by one tube, through the same opening. Instead of removing the drain after forty-eight hours, as formerly, we leave it until the third day.

In dressing the wound, small pads or a number of sponges are placed over the space on either side of the trachea beneath the regular dressing; this is for the purpose of pressure to keep the raw surfaces in apposition and to prevent accumulation of blood and serum; this apparently insignificant detail is considered important because in one of our early cases neglect of this precaution resulted in the death of the patient four hours after the operation; pressure from a large clot which had formed caused collapse of the trachea. In toxic cases, hypodermoclysis of normal saline solution is giv-

en; the needles being inserted after the patient is asleep and the solution allowed to enter slowly while the operation is in progress.

The average thyroidectomy requires little after-treatment. In the absence of complications the patient should be able to leave her bed on the fourth or fifth day. In event however that so-called post-operative hyperthyroidism follows the operation prompt and energetic treatment is necessary. In the presence of high temperature, rapid pulse and respiration and the usual extreme excitement, the treatment with ice-packs as advocated by Crile, gives results that border on the phenomenal; we have used this treatment in a number of cases and can testify to its merits.

The foregoing paper is based on experience gained in approximately 230 thyroidectomies. In an early series of about forty cases, of which we have no record, there were three deaths. In the later series of 194 cases there were two deaths. The first patient of the last series was the one mentioned as having died from the formation of a clot with resulting collapse of the trachea from pressure; thus leaving 193 cases with one death. The latter was a woman 66 years of age with advanced nephritis and myocardial degeneration. She had an enormous substernal adenoma which caused pressure to the extent that she was cyanosed and greatly distressed from dyspnea. Thyroidectomy was done under local anesthesia. She stood the operation well, and obtained almost instant relief but died suddenly two hours later apparently from collapse of the trachea.

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DISCUSSION

DR. ARNOLD SCHWYZER, St. Paul: Dr. Plondke has given us in a short space of time a review of the whole subject of goiter. It is a gigantic task to speak on the goiter problem in that short time. When we figure that he had 194 cases, with only 2 deaths, we must consider his results splendid.

He mentioned the point that in the last ten years goiter surgery has really taken proper hold of our interest. That is quite true. In the last ten years an enormous amount of work has been done, and goiter surgery has become very popular in the West, due to some of our great leaders. But just for the sake of history, I would like to say that twenty-five years ago I remember how Kocher felt badly when he had one death out of several hundred cases. Twenty-four years ago I remember he showed one day in his clinic ten patients with large goiters. They were then operated upon and the following week these ten patients were lined up in the lecture room without any dressings except a small collodion gauze strip. The mortality at that time in the hands of master surgeons was already very low.

I am glad Dr. Plondke mentioned one important thing that was brought out by Marine, the possibility of avoiding the frequency of goiter by giving school children in the goiter zones iodid of sodium. This has been taken up in Switzerland since Marine brought it to the attention of the profession and it has been given attention very intensively. Over there they prepare the iodid in chocolate tablets to give the school children.

We may hope for our future generations an enormous reduction in the number of goiters, and America can be proud of having accomplished that.

The doctor did not have time to speak, for instance, of intrathoracic goiters; nor did he speak of malignant goiters, but just there I would like to mention one thing. If we have, in a patient of forty or more years, a goiter that begins to be painful and begins to become hard and a little nodular, it is a wise thing to think of carcinoma even in the presence of slight fever. You should not make too readily the diagnosis in a more or less harmless subacute thyroiditis, which may be treated by procrastination, but if there is a hard nodular condition think of carcinoma, because it is only early treatment that will do any good.

The doctor in describing his technic mentioned the fact that he has never had any trouble from the removal of too much tissue. I have seen him operate and I know how careful he is. A short time ago I saw a case of tetany in my office, and I mention this to warn those who are too ready to take everything away. This patient a lady, had tonic contraction in her arms and hands. She had been treated with parathyroid with this very insufficient result. She had been a stenographer and was, of course, not able to take care of herself. It was a strange thing that with the addition of large doses of calcium, that spasm disappeared rapidly within twenty-four hours. Unfortunately I have no later report.

As to the deaths the doctor had, they were from collapse of the trachea. He thinks that a lack of application of pressure by the dressing was the cause of hemorrhage, but I do not think so. Forces, such as vomit-

ing, which will make postoperative bleeding, are stronger than any little pressure against the neck can overcome. A straining motion will do very much more than a dressing can readjust. I have done goiter surgery for twenty-five years. Of the non-toxic goiters, including intrathoracic goiters and the carcinomatous goiters, I have lost one case, and this was also due to collapse of the trachea (intubation followed by severe bronchiolitis). I think that what Dr. Plondke had to deal with practically, was collapsing of the trachea not due to too much bleeding, but due to a softening of the trachea by the pressure of the goiter. If we have a goiter that presses on the trachea we get degeneration of the cartilage rings, which is a myxomatous degeneration, and that the trachea can collapse in inspiration. In my last operation this accident happened again. The anesthetist told us that the patient was in a bad condition; she had that disagreeable inspiratory stridor and was dark blue. We put a silk-worm gut suture on each side through the goiter stump and pulled on them. We could then close the wound up; the silk worms emerged from the angles of the skin wound. As long as we held these sutures the patient was in fine condition, and when they were let go, she was shocked. A very short while after closing the wound the patient was all right, and the next day we could pull out the strings and the wound healed. This seemed better than suturing the sides of the stumps to the muscles. You are in better control of the situation.

DR. T. L. CHAPMAN, Duluth: One of the most interesting of all the phases of goiter surgery, is the impossibility of estimating, with entire exactness, any given result of surgical attack. Only recently has it been well understood that there are no laboratory tests, no matter how significant and enlightening, of the speed, severity, and phase of progress in exophthalmic goiter,—that can take the place of the general clinical estimate, made with the aid of the eye, the ear, and the understanding of the examiner. The attitude of the patient, his morale toward his enemy the disease, the natural history of the disease itself, and its oncoming exacerbations and declines in toxicity,—all of these factors are of much more import than the mere rate at which his disease is consuming him. Crile has lately expressed the opinion that, as an estimate of operability, the basal metabolic rate is certainly not to be depended upon, and other noted clinicians have argued to similar purport.

I find myself in interested agreement with Dr. Schwyzer's remarks concerning the dramatic and immediate cure of the pulmonic disabilities attendant upon the removal of large substernal growths, some of which have produced severe pressure symptoms perhaps for twenty years, with the usual diagnosis of asthma. Nothing could be more satisfying to surgeon and patient than a well conducted diagnosis and treatment of a case of this kind.

It is a pleasing commentary upon the success attending goiter surgery that many patients, with what in time will become toxic or mechanically interfering adenomas, are led by the safety of the procedure, to come for removal of the unsightly growths, at a time much before the possible toxicity has manifested itself to a dangerous degree. Formerly these cases were seen for the first time, with severely injured myocardial competency, dyspnea, edematous ankles and albuminuria, and their cure in conse-

quence was much more problematic than if it had been attempted at an earlier stage. Nevertheless it is amazing to what a degree of health just this type of patient can be brought by the act of gentle removal of his hyperfunctioning adenomatous tissue, with the aid of local anesthesia, nitrous oxide analgesia and the necessary rest and medical stimulation of the vascular and renal functions. Even when in extremis, a fair proportion of these patients are restored to useful life and reasonable activities.

With regard to the actual death rate of goiter surgery, it certainly is becoming less year by year, and constant improvement in technical details of management of these cases is recorded in the enormous literature. One feature remains, to my mind, a grievous drawback to exact prognosis in goiter surgery, and that is the question of persistent thymus. Within the brief period of a year, it has been my misfortune to have the entire mortality represented by three of these cases, two proven by autopsy, the other clinically corresponding. In one the thymus weighed 60 grams, in another 70 grams. It has long been known that persistent thymus occurs in a high percentage of goiter subjects, both of Basedow's disease and others; the earlier writers, influenced by a copious post-mortem experience, produced ample evidence of this fact. Of late the subject has not been so constantly referred to; nevertheless, it still deserves much consideration in view of the probability of sudden death when an anesthetic of any kind is given to this type of patient. In Kocher's *Operative Surgery* this phase of prognosis is considered and it is advised that the sternal region be percussed out, the suprasternal fossa palpated, the throat be inspected for tonsillar hypertrophy, and the spleen be investigated,—lest one lead his patient to an unjustifiable situation. Still, if the use of the roentgen ray be added to these investigations, it is so rare as to be almost unique that a diagnosis of persistent thymus can be made with accuracy, and, until this can be done, there must be some unexpected, sudden and distressing deaths. It is a matter of much significance, in taking a history, that a patient with Basedow's disease, assures the examiner that he never underwent an illness of any severity whatever. These are cases to fear, as it is well known that these individuals with persistent thymus very commonly die in any stress of disease whatever. Additional peculiarities of these individuals is that they are usually notably well-grown, handsome, and with fine teeth, skin and hair. All cases of this kind are not impossible of diagnosis. From time to time a large thymus can be visualized fluoroscopically, or upon the roentgenogram; but, by far the greater number will be missed, no matter what aids of mechanics or intellectual effort is brought to bear.

DR. STEPHEN E. WILLIAMS, Chippewa Falls, Wisconsin: I had the good fortune to be with Crile for ten days, and I saw him break his neck, as he said, in trying to save a patient. His 497th case of goiter died; it was a case of toxic adenoma, and his 503rd goiter case died while we were there. He asked us to go home with one thought in view, and that is to try to stop the development of

goiter. He has devoted a good deal of attention along with his assistant and Dr. Marine toward the prevention of goiter, and it is an interesting story to hear him speak of the opposition they have met in Akron, Ohio, and in Cleveland, against the efforts they are making to have the school children take sodium iodid. They use sodium iodid universally in all the schools at Akron, Ohio, and in Cleveland. The Christian Scientists are fighting this movement very hard. Every medical and surgical association should take an interest in this subject and bring it up. I think we have lost sight of the fact that if we do not put our shoulders to the wheel and prevent this, as Dr. Willard Bartlett says, we will be a race of degenerates. Willard Bartlett in a paper read before the Wisconsin Surgical Association stated that the people in the Great Lakes region were suffering from an epidemic of goiter very much the same as they had in Carthage and Rome, and that the United States suffered from an epidemic of goiter many years ago. He claimed that goiter was undermining our race in the Great Lakes region, and spent one evening to prove to our satisfaction that there is something in it, and that it is a simple matter to feed children something that will prevent it.

I think the paper of Dr. Plondke is one of the finest contributions I have ever heard.

A MEMBER: How much sodium iodid is given to these children and how long is it continued?

DR. WILLIAMS: They are given 2 grains of sodium iodid, once a day, for two weeks at the beginning of the school year and at the end of the school year, and every child should have the same dose. The children stand it better than girls in high school, and those are the ones in whom we may expect to have cases of exophthalmic goiter on our hands at any time. The children stand the sodium iodid better.

DR. F. J. PLONDKE (closing): In attempting to cover the whole subject of goiter in a limited paper, many of the important points are necessarily touched upon too lightly, and others as thyroiditis, cancer and intrathoracic goiter were purposely omitted.

In my statement regarding the improvement in the last decade, I had reference mostly to the purely scientific side of the subject, namely such work as that done by Crile, Plummer, Kendall, Marine and Kimball. We must all admit that Kocher, considering his time, had technic superior to any yet developed.

In the case mentioned as having died from collapse of the trachea, the wound was opened after death and a large clot found pressing the sides of the trachea together.

We are sure that our low death rate is not due so much to operative technic, as our ability after careful study to differentiate between the various types of goiter and thus by preparatory treatment get the severe cases in good condition for operation.

I wish to thank Drs. Schwyzer, Chapman, and Williams for their frank discussion.

PYEMIA OF OTITIC ORIGIN*

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There exists among otologists a consensus of opinion that systemic infection originating in suppurative disease of the middle ear is of far more frequent occurrence than is generally supposed. This conclusion is fully warranted by the numerous reports in recent otological literature of anomalous cases of lateral sinus thrombosis which were unrecognized before operation or autopsy. This opinion seems all the more credible in view of the natural reticence which prevails regarding the reporting of cases having an unfavorable outcome, and from the further fact that many such cases are entirely overlooked because of the infrequency of post-mortem examinations, except in clinical centers.

One of the noteworthy achievements of modern otology has been the marked reduction in mortality from complications of middle ear supuration. A still greater reduction in mortality will result from a more widespread knowledge of the nature of these complications by the man in general practice. It is with the purpose of pointing out the importance of its early recognition, and of calling attention to the most important points in the diagnosis and treatment of otogenous pyemia that we have chosen this subject for presentation before this Society. Lack of time permits only the briefest consideration of the outstanding features pertaining to this condition, with only casual reference to cases which have recently come under our personal observation. These cases are soon to be reported before another society composed of oto-laryngologists.

A pyemia of greater or lesser severity, with but few negligible exceptions, is an inseparable feature of every case of infective lateral sinus thrombosis. For practical purposes the terms lateral sinus thrombosis and pyemia of otitic origin are therefore synonymous. We have employed for this paper the latter title only because it is the more comprehensive term. Though it is well known that we may have systemic infection from a suppurating ear without any sinus involvement,

we must accept a lateral sinus thrombosis as the usual avenue of infection of the blood stream.

Occurrence and Pathology: Lateral sinus thrombosis, with its associated pyemia, is the most frequent endocranial complication of suppurative middle ear disease. Of 1100 operations on the temporal bone performed by Gerber¹, forty-one were for lateral sinus thrombosis. Twenty-five were associated with acute infections, and sixteen resulted from chronic otitis. Mygind², reporting seventy cases of lateral sinus thrombosis, found it more frequent in males than in females, in the proportion of thirty-seven to thirty-three. Two-thirds of his cases were under fifteen years of age, a significant fact, since individuals under this age constitute only one-third of our population. Among infants and very young children, it is a much less frequent complication than brain abscess or meningitis. The right sinus is more often affected than the left, probably because of its larger size and deeper situation, whereby it is more exposed to infection within the temporal bone.

The majority of cases of lateral sinus thrombosis originate in a mastoiditis. Many (in Mygind's series 60 per cent) are associated with a perisinus abscess, with a confluent mastoiditis. Not infrequently, however, the phlebitis is the result of a direct extension of the infection from the overlying bone. Kopetsky³ has called attention to its frequent occurrence with the hemorrhagic type of mastoiditis, characterized by marked inflammatory involvement of the bone, but without cell wall destruction. These cases are often encountered in influenza and show an early tendency to metastasis. In such cases, the thrombosis begins in the veins of the mastoid, extending thence into the sinus. Koerner has described an osteo-phlebitis of the mastoid which may give rise to pyemia without gross involvement of the lateral sinus. This condition was found in five of Mygind's cases.

A thrombo-phlebitis occurs at times primarily in the jugular bulb through extension of the infection from the floor of the middle ear. This is apt to occur in young children.

The inflammatory changes in lateral sinus thrombosis are not unlike those of a thrombo-phlebitis elsewhere in the body.

Lateral sinus thrombosis may terminate in any one of five ways, according to Braun⁴:

1. The patient dies of general sepsis before the clot breaks down.

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2. The clot breaks down in the center and perforates the outer sinus wall, discharging into the cavity of the perisinus abscess.

3. Perforation takes place toward the cranial cavity, resulting in a meningitis or cerebellar abscess.

4. The thrombus may organize and cause obliteration of the sinus.

5. The thrombus may be absorbed with recanalization of the sinus.

The streptococcus hemolyticus is the bacteriological cause in over fifty per cent of cases of pyemia of otogenous origin, next in frequency being the streptococcus mucosus. Leutert believes that every case of otitis which shows a bacteremia has sinus involvement, while Libman has shown that bacteremia is present at some time in every lateral sinus thrombosis, except in the rare cases in which the thrombus has remained sterile from the beginning. Both Brieger⁶ and Kobrak report cases of pyemia with metastatic abscesses in which at post-mortem no thrombus was present. One of our fatal cases was of this type. Libman⁶ has demonstrated that bacteremia is most likely to be present during or just after a chill, and that it disappears within a few hours after drainage of the sinus and ligation of the internal jugular vein.

Symptoms and Diagnosis: A typical case of pyemia of otitic origin presents no difficulties of diagnosis, when it is accompanied by the classical symptoms of an intermittent fever, with chills and profuse perspiration, a positive bacteremia, a leucocytosis higher than that occurring in an uncomplicated mastoiditis, a high polynuclear count, a definite metastasis, a subicteric or icteric color and great prostration. Unfortunately, were we to wait for the appearance of even a majority of these typical symptoms, the greater number of our patients would be lost. Atypical cases appear with very great frequency, as noted by Barnhill⁷, Kopetsky⁸, Day⁹ and many others. In our own relatively limited experience of atypical cases there arose not a few perplexing diagnostic problems.

The chief difficulties preventing an early diagnosis come from the fact that the patient has not been studied with sufficient detail from the beginning.

Of the general symptoms, the temperature is

by far the most important. Instead of fluctuating from normal to the usual elevation of 104° to 106°, its maximum may not exceed 101°, as reported by Emerson¹⁰. It may even be subnormal at times. A two-hourly, twenty-four hour temperature chart in such cases will often show slight, but suggestive fluctuations pointing to recurring invasions of the blood stream. There may be more than one marked elevation of temperature per day, or it may remain normal or subnormal for two successive days, as was observed in one of our cases, that of a child of six who died of septicemia, without gross findings in the sinus.

In atypical cases the chills may be so slight as to be unobserved. Questioning the patient as to the presence of chilly sensations and palpating the extremities or patellae of a phlegmatic or apathetic individual, may disclose what would amount to a chill in a more sensitive patient. Sweating may occur without the preceding chill, and may not be noticed.

The pulse is proportional to the temperature, unless it is affected by irritation of the vagus, or by a brain complication.

The gastrointestinal symptoms are those usually accompanying a septic fever. Vomiting without relation to food intake occurs in many cases.

Vertigo is rare, and is to be referred to labyrinthine or cerebellar irritation. In the case of a young man under our care the vertigo was so severe as to suggest a serous labyrinthitis for several days until metastases appeared on the sixth day after the onset of his ear symptoms.

The sensorium is usually unaffected until very late in the disease.

Metastatic lesions, after other foci have been excluded, are almost a conclusive proof of pyemia from the sinus or mastoid. They occur most frequently in the lungs in the form of lung abscess or pneumonia. In one of our cases the presence of a severe central pneumonia obscured the diagnosis. In every case of pneumonia associated with a suppurating ear or mastoiditis, one should think of the possibility of it being of metastatic origin. The number of cases of pneumonia occurring in the course of acute ear diseases is at least suggestive.

Metastases in the subcutaneous tissue or muscles are frequent, and do not always break down. They may even be so painless as to be overlooked, as pointed out by Leegaard¹¹. With less frequency, metastases occur in other parts of the body.

Of the local symptoms, pain is the most characteristic and most constant. This, however, varies greatly. Attention cannot be called too emphatically to the fact that there may be an absence of local pain, particularly in those cases of latent mastoiditis, which not infrequently occur, with complete absence of both pain and fever. In such cases a functional test of the hearing and an otoscopic examination will often reveal an otitis which has escaped notice. Here the roentgenogram may be of special help in revealing alterations within the mastoid. Persistent pain following the simple mastoid operation, especially if accompanied by fever of the intermittent type, points to sinus thrombosis.

Pain or tenderness on pressure in the region of the mastoid emissary vein (Riesenger's symptom) indicates a perisinus abscess or sinus thrombosis.

Headache, when unilateral and on the side corresponding to a suppurating ear, is suggestive of any endocranial complication, including sinus phlebitis.

Pain or tenderness in the posterior triangle of the neck indicates the probable extension of a phlebitis into the anterior condylar vein.

If the pain in the mastoid region is severe and persistent, it is probably the result of a secondary localized serous meningitis.

Only as the result of an extension of the infection into the cranial cavity do we get symptoms on the part of the cranial nerves, the abducens being most often affected.

Involvement of the wall of the internal jugular vein manifests itself in swelling and rigidity of the neck from infection of the neighboring lymph glands. This is usually a late symptom.

Gerhardt's sign, consisting in an unequal filling of the veins of the two sides of the neck, is occasionally present.

Changes in the optic disc are present on the affected side in a number of cases, different writers giving from twelve to fifty per cent as the frequency of positive intra-ocular findings in cases of sinus thrombosis. Ophthalmoscopic examination showed definite alterations of the disc in one-third of our cases. As a help in determining which of the two sides is the seat of the sinus thrombosis, in cases of double mastoiditis, the presence of an optic neuritis on one side would be of great assistance.

One may be at a loss in diagnosing a sinus thrombosis from the local findings even after exposure of the sinus, for its appearance is often no criterion as to whether or not it contains a thrombus. Two of our cases, one dying of pneumonia, the other being in a highly septic condition when first seen, showed only healthy bone overlying the sinus, the sinus wall in each case appearing normal. Perisinus abscess, even with great thickening of the sinus wall, but without pyemia, is a common finding in acute mastoiditis.

Our chief aid in making an early diagnosis, especially in atypical cases, is the blood culture¹². One or two negative blood cultures signify nothing. A positive bacteremia, however, after excluding such conditions as an acute tonsillitis, erysipelas, septic endocarditis and other infections which might produce bacteremia, is almost indisputable proof of the existence of otogenous pyemia, when there is present a mastoiditis or middle ear supuration.

Diagnostic puncture of the sinus, according to Dench¹³ and others, is dangerous and unreliable. It is justifiable when, with a bilateral mastoiditis, it becomes necessary to determine which is the affected side, the culture showing the greater number of colonies per given volume of blood indicating the sinus to be operated.

In the beginning stages it may be necessary to differentiate a pyemia of otitic origin from peritonillar abscess, a severe pneumonia, malaria, typhoid fever, erysipelas, acute digestive disturbances in children, and the initial stages of the acute infectious diseases, all of which may show a bacteremia.

Prognosis: Mortality from pyemia of otogenous origin in the pre-operative era was upwards of ninety per cent. This mortality has not changed for those patients whose medical attendants still live in the pre-operative age. The chances of recovery are directly proportional to the timeliness of adequate surgical intervention. Alexander¹⁴, in a series of ninety-six cases, reports a post-operative mortality of only sixteen per cent. This figure is identical with results reported by Crockett¹⁵ from the records of the Massachusetts Charitable Eye and Ear Infirmary.

Treatment: The treatment of an otogenous septicemia is entirely surgical. Prophylactic treatment consists in the prompt performance of the simple mastoid operation in all acute cases of mastoiditis, and of the radical mastoid operation

in chronic cases, when operative interference, according to modern otological teaching, is at all indicated.

These procedures undoubtedly are effective at times in aborting a sinus thrombosis when in the earliest stages of its development. Later, a positive clinical and laboratory diagnosis of pyemia having been made, conservative surgery has no place in the treatment of this dangerous disease, notwithstanding the fact that much seductive literature has been written favoring a conservative plan of procedure. The further entrance into the circulation of septic material from the focus in the mastoid should at once be prevented by ligating the internal jugular vein. The lateral sinus must then be thoroughly cleared of septic material, its outer wall resected and the cavity allowed to drain, hemorrhage from the sinus being prevented by proper surgical technic. The simple ligation of the jugular, according to Tobey¹⁶, at the point of election above the facial vein is sufficient in most cases when there is no involvement of the vein itself. When it is invaded by the infective phlebitis, it should be resected¹⁷, with ligation of any of its tributaries which may be involved.

In severe cases, with a persistence of pyemic symptoms after operation on the sinus, marked improvement has been noted following blood transfusion. This was very noticeably true in one of our cases, that of the young man with the hemorrhagic type of mastoiditis already mentioned, who had multiple abscesses in the subcutaneous tissue.

In many cases of pyemia of otogenous origin with complications such as pneumonia, cardiac lesions, or nephritis, adequate treatment has doubtless been withheld because of the fear that the patient could not withstand a general anesthetic. Under such circumstances we have employed a local anesthetic with very satisfactory results.

CONCLUSIONS

1. Pyemia having its origin in suppuration of the middle ear is more frequent than we have been accustomed to believe.
2. The best results in combating it can be attained only through early diagnosis, and prompt and thorough surgical intervention. The former demands unusual vigilance and painstaking care on the part of the family physician, who generally is the first to attend cases of ear diseases and their complications.

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DISCUSSION

DR. WILLIAM R. MURRAY, Minneapolis: Attention has been called in the paper presented to the importance of the early recognition of lateral and sigmoid sinus thrombosis, and I merely wish to emphasize one point, namely, the importance of recognizing, at an early stage, pathological changes in the lateral or sigmoid sinus or the jugular bulb when they occur in connection with middle ear infection, or a mastoid infection, or in a case in which there has been recently a middle ear or mastoid infection. When definite symptoms and signs of involvement of the blood

stream in a case which has middle ear or mastoid infection are present, it is very important to recognize the probability of a sinus infection, and the sinuses should be investigated, because a favorable prognosis in sinus infection is inversely proportionate to the duration of the infected thrombus. If an infected clot is present in the jugular bulb, lateral or sigmoid sinus, and that infected clot is allowed to remain and is not surgically drained, the prognosis is exceedingly grave. If an infectious clot is forming in the sinuses, or if it has already formed, but has not reached the late stage and is not discharging septic material into the circulation, operative interference gives a very favorable prognosis. At least, in the early stages, the prognosis is favorable. In the latter stages the prognosis is correspondingly graver.

The method of investigating the sinus is of some importance. It is not sufficient to simply uncover the sinus, and note the appearance of the sinus wall, because we may have extensive changes in the external surface of the sinus wall, and yet there may be no thrombus present. It is misleading to attempt to palpate the lateral sinus with a view to determining whether or not there is present a clot. There may not be a clot present, and yet the sinus may be fairly firm, or, on the other hand, there may be a clot present and we are not able to say by palpation whether or not there is a clot present. If the signs indicate that there is present a sinus infection, the sinus should be opened, then we can determine whether or not there is any infection there, or whether a clot has formed. If a clot has formed within the sinus, if there is an infected thrombus there, the jugular vein should be ligated and the sinus thrombus should be cleared out. Whether or not ligation should be done in preference to excision will depend upon the extent of the thrombus. If the latter extends into the jugular vein, it may be necessary to excise. If it has not extended down into the jugular vein it is unnecessary to excise, but the vein should be ligated above the facial, and this simple operation should not be

attended with very much shock, whereas an excision of the jugular vein is a more prolonged operation and attended by considerable shock, and the results are not better, provided a clot has not formed in the jugular vein.

The symptomatology has been covered by the essayist, but I would simply say that the principal signs and symptoms will be a fluctuating temperature, and bacteremia. The other signs and symptoms mentioned in connection with sinus thrombosis are variable. Some of them are present, but very often they are absent.

DR. L. W. MORSMAN, Hibbing: In the first part of his paper, Dr. Newhart brings out the point that oftentimes we do not have symptoms in lateral sinus thrombosis. I wish to report a case I now have in the hospital. The patient is a woman, 50 years of age, on whom I have been hesitating to operate on account of her general physical condition. She had a subperiosteal abscess formed from a furuncle, secondary to a chronic otitis media. I now determined to operate. Her temperature and pulse were always normal. There were no symptoms of sinus thrombosis manifested in any way; yet we found a complete necrotic mastoid with a thrombosis extending about three centimeters. A complete exenteration was performed with removal of thrombus. She recovered nicely from the operation; her temperature never went above normal. The case is an illustration of a patient manifesting no symptoms whatsoever, and yet we had that very marked pathological condition present.

DR. HORACE NEWHART, Minneapolis (closing): I wish to emphasize one point, for which there was no time in the reading of the paper, and that is, that even in late cases with complications and which present a very unfavorable prognosis, we should have the courage to do everything possible to remove the primary focus and to prevent further invasion of the blood stream, employing a local anesthetic, when a general anesthetic is contraindicated.

STUDIES ON THE RESPIRATORY ORGANS IN HEALTH AND DISEASE

V. A COMPARISON OF LUNG CAPACITY READINGS AND PHYSICAL SIGNS IN PULMONARY TUBERCULOSIS*

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As early as 1846 Hutchinson made a comparison of vital capacity readings and stage of disease in pulmonary tuberculosis. He found the vital capacity reduced from 3,670 to 2,441 cubic centimeters in the early stage and from 3,605 to 1,360 cubic centimeters in the advanced stage of the disease. Arnold in 1855 made a similar study and arrived at conclusions which were not unlike those of Hutchinson.

Recently Dreyer and Burrell (1920) made a report of the results of observation on 200 tuberculous individuals in whom they found the lung capacity test a valuable aid in the classification of cases.

Wittich, Meyers and Jennings (1920) reported findings on a series of 80 tuberculous cases.

OBSERVATIONS

This study includes observations on 230 men and women of whom more than 200 were frank cases of tuberculosis. Nearly all the physical examinations were made by two lung specialists who classified the patients into the various stages of the disease before it was known that the lung capacity test would be taken. The vital capacity and other necessary measurements were taken and the physical fitness percentage was computed in each case by an individual who had no knowledge of the physical findings and the stage into which the patient had been placed. A comparison was then made of the physical signs and vital capacity readings and the curves were plotted, and the tables made from the original examinations and observations.

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*The Hennepin County Tuberculosis Association of Minneapolis made this work possible by establishing and supporting a research fellowship in the University of Minnesota. Therefore, I wish to express my indebtedness to this association.

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The lung capacity readings were all taken with the water spirometer. The age, standing height (without shoes) sitting height, chest circumference and net weight were then recorded and the physical fitness percentages calculated from these measurements.

The theoretical normal lung capacity was taken from Dreyer's tablets in which the calculations were made from the trunk length and chest circumference. From this normal lung capacity and the observed lung capacity the physical fitness percentage was computed. In many cases, however, the percentage seemed high for the extent of involvement revealed by the physical examination. Therefore other methods were used as follows: The normal body weight of each individual was ascertained from the Weight Tables of the Prudential Life Insurance Company. Using this weight, the theoretical normal lung capacity was computed from the formula:

$$\frac{\text{Wt.}^{0.72}}{0.69} = \text{V. C. for men.} \quad \frac{\text{Wt.}^{0.72}}{0.85} = \text{V. C. for women.}$$

In the last method, the surface area of the patient was divided into the observed lung capacity. This gave the number of liters of air exhaled per square meter of body surface. From this number and the known normal the percentage was easily calculated. The percentages obtained from the three methods were averaged and the mean percentage was allowed to represent the physical fitness of the patient. It is interesting to note that the percentages obtained from the use of Dreyer's tablets were usually somewhat higher than those obtained by the two other methods.

I have taken vital capacity readings on some 350 tuberculous individuals and have observed no harmful effect to any patient. Other observers have reported that their patients apparently received no injury from the lung capacity test.

The patients were grouped as follows: (1) Suspected cases (a) no physical signs, (b) indefinite physical signs; (2) definitely tuberculous cases, (a) minimal stage, (b) moderately advanced stage, (c) far advanced stage.

Table I shows that in Group I there are 21 cases with no physical signs. The average physical fitness percentage for the group is 98. The highest physical fitness percentage is 122 while the lowest is 80. In Group I there are also 7 cases whose physical signs are indefinite. The average physi-

cal fitness percentage for this series is 93. The highest physical fitness percentage is 125 while the lowest is 74.

TABLE I

GROUP I Suspected Cases	Number of Cases	Average Physical Fitness (per cent)	Highest Physical Fitness (per cent)	Lowest Physical Fitness (per cent)
(a) No. physical signs	21	98	122	80
(b) Indefinite physical signs.....	7	93	125	74
GROUP II Definitely				
Tuberculous Cases				
(a) Signs of minimal disease	45	90	126	64
(b) Signs of moderately advanced disease...	87	70	112	26
(c) Signs of far advanced disease...	70	49	86	26

In Group II we find 45 cases whose physical signs reveal evidence of minimal disease. The average physical fitness percentage for this series is 90, while the range of physical fitness is from 64 to 126 per cent. In 87 cases the physical signs revealed evidence of moderately advanced disease. The average physical fitness percentage of the series is 70. The highest and lowest physical fitness percentages are 112 and 26 respectively. There are 70 cases in Group II whose physical signs reveal evidence of far advanced disease. The average physical fitness percentage of these cases is 49. The range of physical fitness is between 26 and 86 per cent.

Percentage frequency curves Fig. (1) were constructed in an attempt to more easily visualize the results of the work. A glance at these curves shows that in a general way the physical fitness of the patients decreases as the physical signs increase. In plotting these curves the suspected cases who had indefinite signs were grouped with those who had no physical signs. The curve shows that there are only 3 per cent of the cases with a physical fitness between 70 and 80 per cent. Approximately 21 per cent of the cases have a physical fitness between 80 and 90 per cent. The mode of this curve is formed by 27 per cent of the cases whose physical fitness percentage is between 90 and 100. Between the physical fitness percentages of 100 and 110, 110

and 120, and 120 and 130 are found 24, 13, and 2 per cent of the cases respectively.

It will be seen that approximately 4 per cent of the cases whose physical signs reveal evidence of minimal disease have a physical fitness between 60 and 70 per cent. There are approximately 17 per cent of the cases in this series whose physical fitness percentage is between 70 and 80. The mode of this curve is formed by 35 per cent of the cases whose physical fitness is between 80 and 90 per cent. There are 17 and 15 per cent of the cases of this series whose physical fitness percentage is between 90 and 100, and 100 and 110 respectively. From here the percentage of cases rapidly decreases until only approximately 2 per cent show a physical fitness between 120 and 130 per cent.

The patients whose physical signs reveal evidence of moderately advanced disease show the greatest variation in physical fitness of any series in either group. It will be observed that 3 per cent of the cases in this series have a physical fitness between 20 and 30 per cent. There are no cases which show a physical fitness between 30 and 40 per cent. Seven per cent, however, have a physical fitness between 40 and 50 per cent. From here the number of cases increases until the mode is formed by those whose physical fitness is between 60 and 70 per cent. The number of cases whose physical fitness is between 70 and 80, 80 and 90, 90 and 100, and 100 and 110 per cent gradually decreases until only 1 per cent show a physical fitness between 110 and 120 per cent.

In the series of cases whose physical signs show evidence of far advanced disease there is only 1 per cent with a physical fitness of 20 to 30 per cent. The mode of the curve is formed, however, by 28 per cent of the cases of this series whose physical fitness is 30 to 40 per cent. A glance at the curve shows that the majority of cases in this series have a physical fitness below 60 per cent. However, nearly 3 per cent of the cases are between 80 and 90 per cent physically fit.

DISCUSSION

We know there is a great deal of individual variation in lung capacity depending somewhat upon such factors as occupation and past physical training. It is not uncommon to find an individual indulging extensively in athletics with a lung capacity of 120 per cent or more. Furthermore it is possible for an individual whose lung capacity is 100 per cent to increase that capacity somewhat

by special training. On the other hand one occasionally sees a person leading a sedentary life whose lung capacity is reduced to 90 per cent. Yet thorough examinations reveal no lesions of any clinical significance in the lungs or heart. If the lung capacity or physical fitness of an individual is reduced much more than 10 per cent one becomes suspicious of existing disease either in the lungs or heart; however, such factors as obesity and old age may some times account for such reductions. It was pointed out in a previous paper (Myers 1921) that an individual with an over-developed lung capacity (for example 120 per cent) may develop definite disease and have a lung capacity reduced 30 per cent and still appear to be within normal limits. Therefore, the examiner should always be on his guard when a patient with questionable or even definite physical signs proves to have a physical fitness of 100 per cent or more. A very detailed inquiry should be made into the past physical training and experience of such an individual. Every known test and examination of any clinical value should be given, and in the final analysis of such a case one must be very cautious not to place too much emphasis upon the fact that the lung capacity is 100 per cent for this may be apparent rather than real for this individual. In this type of case a safe diagnosis is often extremely difficult. In such cases one may be greatly aided and relieved by being able to obtain from such sources as a college or university or an industrial institution the actual lung capacity of a given individual recorded months or years before and at a time when he was in good health.

In the group of patients with indefinite or no physical signs of pulmonary tuberculosis a few showed physical fitness percentages as low as 70 to 80. One may be quite sure that in patients who fall this low there is disease of clinical significance although the physical signs may not definitely reveal it. Although the majority of cases in this group showed a physical fitness well within the above normal limits, they were very carefully observed over a period of several weeks. Most of them were found to have a tuberculous infection but no tuberculous disease.

In the series of cases whose physical signs showed evidence of minimal disease there are a few whose physical fitness was reduced to between 60 and 70 per cent of the normal. One case is rather striking in that the physical signs were very slight on first examination and the x-ray examination revealed

evidence of a very small area of infiltration in the first interspace on one side. Nevertheless this patient, although the symptoms were not marked, had a physical fitness reduced to 64 per cent of the normal. In such cases the physical fitness test gives much more information as to the toxicity and severity of the lesion than do the physical signs. Garvin, Lundsgaard and Van Slyke pointed out that in such cases reduced lung capacity is due to an increased amount of residual air and not to actual destruction of lung tissue.

It is interesting to note that many of the cases in this series showing signs of minimal disease have a physical fitness percentage which is quite or even above normal. This may be explained in two ways. First, some of these individuals may have had a much overdeveloped lung capacity when in good health and the physical fitness although apparently normal may in reality be considerably reduced. Second, since the physical signs give us information as to what has occurred in the lungs in the past and little or no information as regards present activity it is possible that many of these cases have old tuberculosis which at present is insignificant clinically. For example, a young man recently came in for an examination of the lungs. He was 6 feet tall and weighed 195 pounds. Physical examination of his chest revealed impaired resonance on the right side to the third rib, bronchovesicular breathing, type II to the second rib; vocal resonance and whispered voice were definitely increased to the second rib. Râles were numerous after enough to the second rib. The x-ray examination revealed a definite Dunham's cone in the right upper lobe. This patient did not have one of the cardinal symptoms of pulmonary tuberculosis and his physical fitness was found to be more than 100 per cent. After his examination was completed he handed me one letter from Dr. Cabot of Boston and another from the Rutland Sanatorium (Mass.) in which were listed the physical signs and x-ray findings four and five years ago respectively. It is interesting to note that practically no change had occurred in his physical signs and x-ray findings to the present time, yet this individual is working every day and has done so for the past three years.

We find a very small number of cases with signs of moderately advanced disease with a physical fitness percentage as low as the lowest cases whose physical signs reveal far advanced disease. In such cases there is a possibility that the examiner was

liberal with his classification or since a few weeks sometimes elapsed between the physical examination and the taking of the lung capacity it is possible that the disease progressed rapidly into the far advanced stage. It seems more probable, however, that such cases have lesions of a very severe nature which reduce their physical fitness as much or more than much more extensive lesions of a mild nature. On the other hand 16 per cent of the cases who had signs of moderately advanced disease showed a physical fitness within or above normal limits. The statements made regarding cases with signs of minimal disease whose physical fitness is within or above normal limits also apply in similar cases who have signs of moderately advanced disease.

The majority of cases of the series whose physical signs reveal evidence of far advanced disease have a physical fitness below 60 per cent, however, there are a few as high as 80 to 90 per cent. It is not uncommon to find individuals with numerous râles over both lungs and other physical signs of far advanced disease who are working every day.

A glance at the frequency curves (Fig. 1) shows that the results obtained from the assessment of an individual's physical fitness through lung capacity, surface, area, weight, stem length and chest circumference aids greatly in the diagnosis of pulmonary tuberculosis of clinical significance. The curves also show, however, that the lung capacity test is not infallible, for a considerable number of cases with physical signs of minimal and even moderately advanced disease have a physical fitness within or above normal limits.

The lung capacity test is more valuable than the physical signs in ascertaining the severity of the disease, as one patient may have very extensive physical signs and yet have a physical fitness which closely approaches the normal limits while another patient with very slight signs may have a physical fitness reduced to 60 per cent of the normal.

Subsequent lung capacity tests are very valuable in studying the effects of treatment of the disease, as they often register changes in the functions of the lungs before the physical signs change. One of the cases in the series showing signs of minimal disease had a physical fitness of 64 per cent when sent to the sanatorium. After four months' treatment this patient's physical fitness was found to be nearly 90 per cent. In the case of a medical student whose physical fitness was much reduced before treatment was begun, it was found that at the end of six

months of postural rest at home her weight had increased from 110 to 150 pounds and her physical fitness had increased to nearly 85 per cent. On the other hand cases who do poorly on treatment show a stationary or decreasing physical fitness.

It is unsafe to give too much value to the lung capacity test in rendering a prognosis when a case is seen for the first time. For example, the lung capacity may be reduced 15 or 20 per cent, yet the lesion may be of a very progressive nature and cause an extremely rapid decline of the patient. Again the lung capacity may be very low but the patient may be of the type that responds quickly and surely to the treatment. Subsequent lung capacity readings become of great value, however, in rendering a prognosis.

The physical signs are indicative of what has occurred in the lungs in the past and they give us very little information as regards present activity of a tuberculous lesion. The lung capacity test tells us to what extent the lungs are able to function. After all, the functioning power of the lungs is of paramount importance. It matters little how extensive the physical signs are as long as compensation is developed and maintained sufficiently to insure the individual a reasonable physical fitness percentage. The lung capacity test is the best method of quickly ascertaining the degree of compensation established.

I am deeply indebted to Dr. E. S. Mariette, Dr. F. L. Jennings and Dr. H. A. Bendes, of the Glen Lake Sanatorium, and to Dr. W. J. Marckley, of the Hopewell Sanatorium and Thomas Hospital, for their valuable aid in the accumulation of the data used in this paper.

I wish to express my indebtedness, also, to Professor R. E. Scammon for valuable suggestions and aid in plotting the percentage frequency curves here presented.

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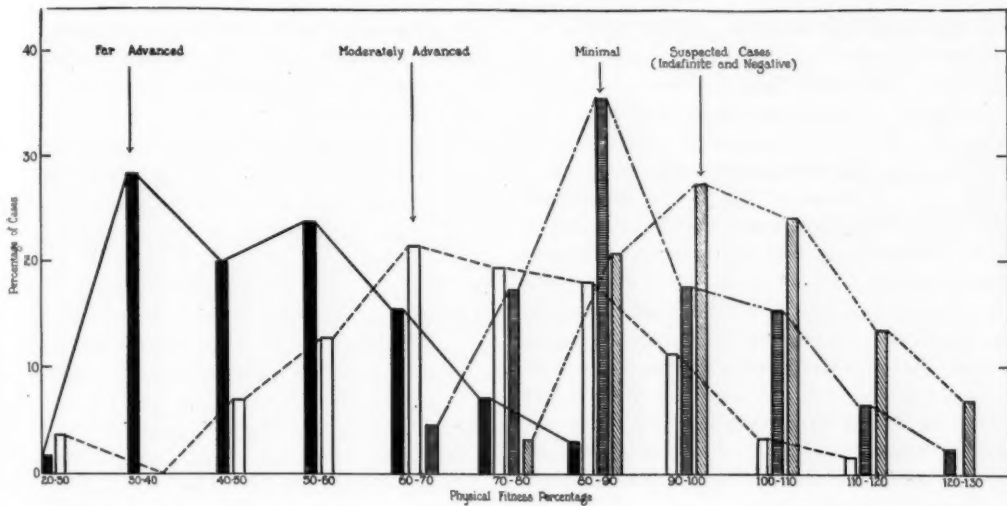


Fig. 1

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DISCUSSION

DR. S. MARK WHITE, Minneapolis: I think the section is to be congratulated on having presented before it a paper of the value that Dr. Myers' paper has. It is a real contribution to our knowledge of a subject that is arousing very decided interest and considerable study at the present time, as is shown by the equally valuable contribution of Drs. Ulrich and Nathanson on what might be termed an allied topic.

Upon a consideration of what enters into this vital capacity it is evident at once that we are not speaking of the mechanical reduction in the amount of lung tissue which is functioning, but that we have certain other factors such as were brought out in the other paper. Prob-

ably a decreased elasticity of the alveolar wall is present and that factor probably pertains in as definite a sense in this field as it does in the other, because in tuberculosis we are dealing usually, in an active case, with toxic factors as much, or often more, than we are with mechanical factors and we are aware that tuberculosis as an infection has effects upon the myocardium and upon the musculature, and the vital capacity is determined to a certain extent by the part the myocardium plays and the pulmonary circulation, and involves also, to a certain extent at least, the tonus and capacity of the skeletal musculature. So it is evident that in this study of the vital capacity we are dealing not with a single element, but with the changes in the heart or skeletal musculature, and Dr. Myers has very well brought out the part which the physical history of that patient plays. We cannot take the figures as absolute as Dr. Myers has pointed out; one individual will have a vital capacity considerably beyond the normal and an infection may reduce this considerably and yet the figures remain more than the normal.

A point that should receive particular attention at this moment is the contention that we are dealing not with a test that will give us a diagnosis of pulmonary tuberculosis, but we are dealing with a test that will give us some index not of the tuberculosis but of the vital capacity of that patient. We should be careful to limit ourselves to that. With so many of the tests which are new we are apt to examine the test and think it gives us specific information. It does give us specific information, but as to the vital capacity and it should be limited to that field. One of my pet hobbies is that we should not limit ourselves to narrow studies, but that we must take into consideration the history of the patient, another factor which is of very great value and I believe will be of value in connection with this test.

In conclusion I wish to compliment the Hennepin County Tuberculosis Association, and call your attention to the fact that this work is being done by a group of men in that county, showing us how this work can be done in good fellowship and how we can work together in this way.

HEALTH OF SCHOOL CHILDREN*

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It is noted that the theme of this program is "Training for Service." You, as educators, hold the future of America within the hollow of your hand. The principles and ideals that are inculcated in the minds under your care, may sway the policies of future generations. In this matter of training, you rank second only to the parent. Yours is indeed a grave responsibility. As I look back over my own training, I must admit that for some of my teachers I still have the most profound respect and admiration. Some of the doctrines imparted to me while under their care, have remained through the passing years.

Let us be carried away with modern methods of cramming a child's head with knowledge, we should also keep an ever watchful eye on their bodies. A trained mind overflowing with valuable information is certainly much handicapped by an unhealthy body. "What shall it profit a child if he gain the whole curriculum and lose his health?" Although some of the great minds of the past, in spite of diseased bodies, have contributed much to the literature and progress of the present generation, it behooves us as public servants to see that children develop strong bodies as well as strong minds.

Among school children there will be found some who are almost perfect physically. What methods may be employed to bring the remaining large percentage up to the normal standard? The ideal plan would be to employ a school physician, one who is a real doctor and one who loves children. The school physician should be assisted in his work by one or more trained nurses. Regular, systematic examinations will certainly aid in finding many children below par physically. The teachers and nurses, seeing the children oftener than the physician, can aid by noting any defects and bringing them to the doctor's attention.

Scarlet fever and diphtheria are deadly diseases. By quick quarantine, their spread can be prevented. In the latter, the anti-toxin promptly administered, will greatly reduce an otherwise high mortality. By the use of the Schick test, children who will easily take diphtheria, can be detected; and pro-

tective immunization measures can be begun. Reports from New York City, where much work along this line has been done, are very encouraging.

Measles and whooping cough in themselves alone, are not very dangerous diseases. However, the mortality following these two diseases on account of their serious complications and sequelæ is very high. Quarantine should be instituted at once. The writer can well remember hearing parents and even doctors say there was no use in trying to prevent children from having measles and whooping cough; and also, the sooner they had these diseases and recovered, the better. Modern preventive medicine has far higher standards.

Ninety-seven per cent of the school children in this country have defective teeth. Remember that "mouth health aids body health." A bad tooth is either too bad to keep or good enough to save; every defective tooth in a child's mouth will come under one of these two heads. Dental inspection should be made regularly and instruction given in oral hygiene.

It has been customary within the past few years, whenever we find an undernourished or underdeveloped child, to think of the tonsils or adenoids as a possible cause. These organs should be removed only when they cause trouble or when they have caused several illnesses. An enlarged tonsil does not necessarily mean disease, past or present.

As a student of tuberculosis, as one who daily sees the dying consumptive, I cannot refrain from this opportunity to stress a disease causing a frightful toll of human life. Tuberculosis gathers its victims from the cradle to a ripe old age. No period of man's life is exempt from its ravages. H. J. Achard,* in speaking of "The Child with Latent Tuberculosis," says, "Severe epidemics, such as those of smallpox, slew their thousands quickly and people became alarmed and demanded that the Government should do something about it. Tuberculosis is slow, insidious; yet it slays its millions. Nevertheless the people fold their hands and bow to the Will of God, which is their own inertia, their own unwillingness to bestir themselves."

In homes housing the consumptive, we so often see poorly developed and undernourished children, frequently with enlarged glands, especially in the neck. This generally means that the children have

*Read before Northwest Central Minnesota Educational Association, Moorhead, Minnesota, October 14, 1921.

*H. J. Achard: American Review Tuberculosis, 1921, 405.

been infected with tuberculosis and unless great care is used, they will lose their lives from a preventable disease. The source of infection should be removed at once. This, of course, means the consumptive should be sent to a sanatorium where he will be given the best care and treatment and where he will be taught the principles of hygiene, which, if followed, will minimize the danger of his spreading the disease.

It is not always possible to send the open case of tuberculosis to a sanatorium. This home should then be put on the list of the visiting nurse, who will see to it that preventive measures are used.

What can be done for the children of this home, those presenting the slightest signs of a weakened, "run-down" condition? Day camps and open air schools have proved their usefulness and have helped to solve the problem of the tuberculous and pretuberculous child. For those with manifest tuberculosis it is advisable to employ sanatorium treatment. Results have been very encouraging. However, there are some for whom no provision can be made outside the home. The latter should be placed under the care of a competent physician and should be given plenty of good nutritious food, fresh air and sunshine, with regular hours and sufficient rest.

When a child is kept up to the standard physically, he is much less prone to be attacked by disease; and if he should be stricken his chances of recovery are much greater than the child who is

already "run down." We have all heard some fond mother speak of her child, "Johnny is never very strong. He always takes everything." The National Tuberculosis Association, with thought both for the citizens of the present and the future, has adopted a plan whereby weak children may be improved and the strong kept strong. Under the guidance of this organization, The Modern Health Crusade was formed. Under the direction of their teachers children are taught cleanliness, regular hours, etc., the latter are called health chores and pupils performing these duties satisfactorily are dubbed knights, squires, etc.—the higher rank denoting greater proficiency.

The children are given buttons which indicate the rank they hold in this organization. Under the direction of the teacher, health pageants are shown. These help to educate the general public in matters of right living and instill into the child's mind some of the means and the importance of safeguarding health.

In large cities health problems of schools can be thrown on the shoulders of physicians and nurses. In rural communities, this cannot be done. The teacher must frequently assume the responsibilities of the nurse and occasionally that of the physician. The teacher must train himself to look for any eruption on the exposed portions of the body, the wan, tired look in the eyes, the sallowness of the cheeks and poor development—all probably denoting some form of disease.

MENTAL HYGIENE AND THE GENERAL PRACTITIONER*

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Mental Hygiene is the science of the promotion and preservation of mental health. It is that branch of public health and preventive medicine which concerns itself with nervous and mental ailments, as well as with the function of making normal minds more efficient. After briefly outlining the principles, aim, and scope of Mental Hygiene I propose to dwell on the place the practicing physician should take with respect to this large and important subject.

Endeavors in the field of Mental Hygiene may be classified as *individual*, *institutional*, and *communal*. There is nothing new or even recent in the first class. The practicing physician has almost daily occasion to do something toward promoting a patient's mental health. Efforts of clergymen, teachers, welfare workers, and others in many respects come under this class.

The care given by state hospitals for the insane, for the feeble-minded, epileptic, and inebriates constitutes largely the activity in the second class. It is less than a century ago that the mentally diseased were first treated as sick people, and less than half a century ago that mental defects began to be housed in special institutions devoted to their care. According to statistics compiled by Pollock and Furbush there were confined in the state, county, municipal, federal, and private hospitals 232,680 insane in our country on January 1, 1920. The proportion of mental cases hospitalized varies in the different states. In New York State, where the highest rate of hospitalization obtains, and where institutional care has been most highly developed, one out of every 267 inhabitants is cared for as mentally disabled under an entire institutional regime. In Arkansas, where the proportion is but one to 1,205, over 30,000 mental cases are admitted to state hospitals annually. On January 1, 1920, 40,519 mental defectives were housed in institutions. Dr. Walter E. Fernald estimates that this represents only about 10 per cent of all

the existing cases. Army examinations resulted in the rejection of 3.7 out of every 1,000 cases examined for mental defects. At the beginning of last year 14,937 epileptics were taken care of in special institutions.

Communal endeavors, along organized lines, on the other hand, have had their origin very recently. The first organization in Mental Hygiene in the world began in 1908, when the State society was formed in Connecticut. In 1910 a National Committee for Mental Hygiene was organized, and, by 1920, a little over one-third of the states of the Union had formed Mental Hygiene Societies. Minnesota was not then, nor is now, among these.

The organization of special out-patient clinics, and of neuro-psychiatric social service, survey of correctional institutions, and of school children, disseminating knowledge to the public regarding mental disease or mental defect, are attainments of organized Mental Hygiene, and are a part of the communal program.

Combining individual, institutional, and communal endeavors for definite constructive achievements in (a) conserving and promoting mental health and making sound minds more efficient; (b) in determining causes, the essential nature, and the most suitable modern relief measures instituted early under the direction of the family physician; (c) providing ample hospital and institutional facilities for the care of cases requiring this form of treatment, as well as the organizing of out-patient clinics, satisfactory after-care, and an adequate social service; (d) fostering community organizations to assist in the supervision and care in the homes of the mentally defective; (e) segregating mentally defective and mentally delinquent school children and organizing separate classes, and providing for them special medical and psychometric examinations; (f) safe-guarding against the unlimited reproduction of mental defectives; (g) spreading throughout communities information about prevention and early care of mental disease, and the necessity for supervision of mental defects; (h) co-ordinating public and private agencies: these, in brief, outline the aim and scope of a Mental Hygiene program.

Let us turn to the situation of the neuro-psychiatric ex-service man. The number of mentally disabled soldiers was so great that the Federal agencies encountered a difficult problem. Only a small percentage of these cases were transferred from

*Presented before the Minnesota State Medical Association, Duluth, Minn., August, 1921.

the army to civilian hospitals or Public Health Service hospitals. As time went on, after the armistice, recurrences and new cases developed at a rapidly increasing rate, and the Government was naturally called upon to care for these. To establish contact with the patients and their families was a procedure which required a vast field organization. Neuro-Psychiatric Sections were formed in the District Supervisor's offices of the United States Public Health Service. Happily the Red Cross Social Service agencies reached out by virtue of its organization, highly developed during the war, into nearly every community. Furthermore, it was necessary to establish co-operation with existing state and other local agencies, which has greatly assisted in this work.

Many situations developed which were entirely new to the families concerned. There would be reported an ex-service man in jail, who was said to have suffered from mental disease; another ex-service man would sleep in a straw-pile because he feared people; another became very troublesome in his home, and refused any and all hospital treatment; still another was forging checks and committing thievery; the family could do nothing with him—what was there to be done? There was the man who attempted murder, and who was a paranoiac; he was in jail, the judge requesting attention by the Federal Bureau; then there was the not uncommon man who continually threatened suicide, but whose parents refused to allow him to be taken away from them—these are but a few of the difficulties that had to be met, promptly and effectively. Fortunately the American Red Cross trained neuro-psychiatric social workers. These, understanding social problems in mental disease, established contact with the families. In the larger cities families were visited; discharged mental cases were followed up by home visits; endeavor was made to give intelligent advice from time to time to these men who have unusual difficulties in making their adjustments. *Neuro-psychiatric problems with the ex-service men, however, do not differ essentially from those that exist among the civilian population.*

The sphere of the old-time practicing physician in his community was a broader one than exists at the present time. There has developed among the laity special interest in health problems. The state has assumed responsibility and seeks to give service which the physician formerly gave individ-

ually. The mental case, the feeble-minded, the boy or girl with tendencies to abnormal conduct, or the criminal, must be treated not only from the standpoint of individual care, but the physician must take into account the welfare of the family and the community, and have the interests of the latter thoroughly at heart. His part in Mental Hygiene concerns itself principally with the 90 per cent of the feeble-minded not in institutions; with the borderline mental case; and with the early mental case. It is not widely realized that abnormality in conduct and emotion are subject to natural causes, much as are the aberrant intellectual processes. The latter easily arouse suspicion of insanity or mental defect while, for instance, a criminal is not often thought of as being delinquent; yet, according to investigation, probably half of our criminals and prostitutes might correctly be put under such classification. Other forms of social inefficiency and maladjustments can also be placed in the same category. In the asylums, jails, and almshouses we find the complete failures. The practicing physician should thoroughly familiarize himself with preventive measures, and the most suitable treatment of early mental cases. He should appreciate that the family concerned undergoes severe perplexities. He will counsel the family with tact. To bring about isolation, hospitalization, and necessary medical care oftentimes requires great effort; to allay unnecessary anxieties of the patient and of the family is his supreme duty. He should thoroughly appreciate that through his advice development of severe psychosis may be prevented because it has been carefully estimated that as high as 40 per cent of all mental cases are actually preventable.

Ridiculing mental disease should, above all, be avoided. Dangerous impulsions are often not understood by the kin, and the doctor must, therefore, instruct the family. The physician in the community is many times the first to notice evidences of mental deficiency. Mothers and fathers are very loath to recognize defects in their offspring, especially of a mental nature, and usually ascribe such a condition to teething, to a fall, or other trivial causes. As soon as the condition, however, is actually recognized, the situation should be thoroughly explained to the family, and it should be pointed out by the doctor that such a patient needs special supervision until grown up. The possibility of developing bad habits, such as thievery, criminality, lying, immorality, etc., must

be emphasized, and that these things may be avoided by constant training in institutions especially where some manual ability, sex segregation, and all possible social adaptability may be attained. It goes without saying that the physician should make a special effort to recognize diseases such as birth injuries, hemorrhages, epilepsy, congenital syphilis, etc., and treat them early in order that avoidable retardation of mental development may be obviated.

During the past few years interest in mental cases has greatly increased. *The integrated problems of Mental Hygiene are essentially medical in nature.* In working them out, the services of the teachers, of psychologists, nurses, social service workers, and others, are absolutely necessary.

It is obvious that every individual case of mental invalidity must have a physical examination, and that considerations of treatment are, first of all, medical. In stimulating greater interest in the treatment of mental disease the medical practitioner should take the leading part in his locality; to function as the chief adviser on general as well as individual mental problems will certainly aid in enhancing his position in his community. The need of a State Society for Mental Hygiene, and of a model psychopathic hospital on the University campus, and of Mental Hygiene surveys should be apparent to him; and every medical practitioner should become a member of such a proposed State Society for Mental Hygiene.

DISCUSSION

DR. W. A. JONES, Minneapolis: I quite approve of Dr. Michael's paper and cannot emphasize too strongly the necessity of developing classes of all kinds in mental hygiene. It seems to me the first class ought to start with the mothers or prospective mothers, and they should be carefully instructed in bringing up their children, both from a physical-endurance point and from a physiological method of training. Then, perhaps, we would have a lesser number, among the present generation and in future gen-

erations, of the unfit, the economically, socially, and industrially unfit. This has been borne out by the efforts of men in the service of the government who are concerned with mental hygiene among the ex-soldiers. They have met with an unprecedented number of those who are fundamentally unstable, constitutionally inferior, and wholly inadequate to the work the government called them to do. The experience of the government hospital in Minneapolis has shown what may be done and what has been done with the soldier who comes back with a mental or nervous condition that demands hospitalization, and I am very glad to congratulate the government hospital in Minneapolis on its thoroughness, its good work, and the position it occupies among other government hospitals. Here, too, of course, the same idea has been carried out. What can be done for the neuropsychiatric, unstable man; how can he best be treated, and how can he be brought back into normal conditions of life? Many of them cannot. Many of them are so crippled mentally or nervously (because they were primarily deficient) that they cannot be returned for any adequate service. Some of them may get far enough back so that they may be self-supporting, provided the government can keep its officials in touch with them and thus keep them under the influence of the mental-hygiene board. From rumors that have filtered into the atmosphere it has been impossible for the government forces to take care of all of the cases that should properly come under mental-hygiene control, but evidently the time will soon come when the government will see the advisability of establishing a number of other hospitals so that we can hope to see some benefit from headquarters in Washington.

DR. J. C. MICHAEL, Minneapolis (closing): Education should be emphasized as a cardinal feature in mental hygiene. For instance, how many cases of drug addiction could be prevented if the habit-forming nature of drugs was widely known? Certainly, most of those not due to physical and mental disease and those due in part only to such diseases could be prevented. How many people realize that offspring conceived in the debauches of alcoholism are very apt to be prone to constitutional ailments such as epilepsy, etc.? Would it not be worth while in this respect to educate? I did not try to go into great detail on this subject. I do hope that an interest in mental hygiene may be aroused among the practitioners in this state. Among the laity there are some wrong ideas on this subject and the medical men should be particularly interested in helping to educate the public in sane mental hygiene principles.

MARGINAL AND JEJUNAL ULCERS FOLLOWING GASTRO-ENTEROSTOMY*

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That gastro-enterostomy, which is such a benefit to the patient in need of stomach surgery, should be followed by ulcers at the site of the anastomosis or near by, gives one, on first thought, the impression that one should be very reluctant to advise this operation. However, when we make an analysis of what really happens and in what percentage of cases this unwelcome development occurs, we regain our composure and again look with our heretofore optimism on the brilliant results in so many of the gastro-enterostomized patients, where indications were positive and the surgery performed with a finished technique.

Marginal and jejunal ulcers are definite pathological entities, but the clinical history, and the clinical and radiographic findings do not always permit of a definite diagnosis; however, if we keep in mind the possibility of ulcers forming in the vicinity of the anastomosis and the outlines of the symptom-complex found in the literature with roentgen-ray analysis, we may expect a high percentage of accuracy in substantiating a diagnosis of ulcer.

Mindful of the fact that this subject has been frequently called to your attention in literature, I beg your patience in the presentation of one case of jejunal ulcer with a brief review of the literature.

Mr. G. Primary operation Jan. 29, 1918. Patient was almost exsanguinated. Ligation of vessels at pylorus for a severe bleeding ulcer in duodenum. Posterior gastro-enterostomy using continuous linen for inner suture.

Nov. 6, 1918. Relieved of all symptoms for three months, now complains of gastric distress and gas. Roentgen ray shows prompt emptying of stomach through stoma.

Dec. 10, 1918. Still has gastric distress, stomach upset, pain after eating which is worse at night.

Sept. 15, 1919. Much heartburn, belching and vomiting.

Sept. 17, 1919. Fluoroscope of stomach shows meal freely emptying through stoma, also some by pylorus.

Oct. 27, 1920. For six or seven months had had needle-like pain at night around navel region. Takes Sal Hepatica, which relieves pain and he sleeps. During the day he has heartburn.

Feb. 17, 1921. Complaining constantly, more of late.

Feb. 18, 1921. Roentgen ray examination of stomach. This shows fluoroscopically esophagus and cardia negative. Stomach fills well. Stomach normal in position, no peristalsis visible, contents pass out of stoma very freely and very little by pylorus. On pressure he complains of a tenderness more over lesser curvature than in region of stoma. Roentgenograms (eleven pictures) show a constant deformity in lesser curvature opposite stoma; most of the time an incisura and twice a niche. At the stoma outlet there is a constant mass of barium just beyond the opening and thin strands plainly visible (Fig. 1.) which I now feel like interpreting as threads, with barium clinging to them.

Patient seems in considerable distress, complains of much crampy pain after meals, for which he has for the last three years taken either soda or Sal Hepatica. He expresses himself as feeling much the same as for a short period before the primary operation and urges operation (in fact he went to hospital one day before appointed time because of severe pain at night). There was no point of tenderness on pressure nor mass palpable but pain was referred to left side or middle.

A diagnosis of ulcer was made. Either: (1) ulcer lesser curvature; (2) ulcer near pylorus; or (3) jejunal ulcer.

Operation March 9, 1921. Gas oxygen anesthesia with novocain infiltration according to Crile. Incision through scar of former operation, liver presenting. Stomach was brought into the wound and a very careful examination was made of the whole organ but no infiltration could be felt. A scar could not be seen at site of former ulcer, as it was posterior. Pylorus was patent but broadly adherent to omentum. This was freed. Gall bladder was thoroughly embedded in adhesions. Gastro-enterostomy site was examined and at the proximal limb of the jejunum, 1 cm. from the stoma margin, was a crater ulcer. The jejunum was broadly attached to the transverse colon. With the pylorus patent and healed it was thought feasible to undo the gastro-enterostomy and close the opening in the stomach. The attached jejunum was separated from the colon, in which was a large hole. The ulcer had penetrated the jejunum completely and was burying its way into transverse colon. Advantage was taken of this hole and with the index finger the entire inside of stomach was palpated. The finger went through the pylorus into the duodenum, both of which were normal. On examining the margin of the stoma two linen threads were picked out on the right side of the stoma. The jejunal loop was separated from the stomach and the stomach opening closed completely. The ulcer-bearing section of the jejunum was removed and an end-to-end anastomosis made, using catgut for the inner layer and linen for the outer: There seemed sufficient opening through the anastomosis.

*Presented before the Minnesota State Medical Association, Duluth, Minn., August, 1921.

For three weeks the patient did well, when he again had gas and distress. He seemed to be influenced by worries and troubles at home. Diet and alkalies were advised, but not always carried out. Wassermann negative.

May 12, 1921. Roentgen ray showed food going through pylorus freely and no evidence of a dilated duodenum or any evidence of obstruction at our new anastomosis. The radiograph very nicely shows (Fig. 2) the anastomotic ring and a deposit of barium on the remaining shelving part of the anastomosis with a free opening and no spasm. As there was a good deal of induration in the region of the colon close to the stomach stoma, it was kept in mind that there might be a gastro-colic fistula. Patient vomited at times though never foul material, and also passed undigested food, but no occult blood. A barium enema given June 17, 1921, showed absolutely no barium passing into stomach. Patient was kept quiet and put on bromides and general diet, and did very well, indicating that he probably had a pylorospasm. Later he had more distress, belching, food intolerance and vomiting.

Aug. 1, 1921. X-ray of stomach was negative.

Operation again on Aug. 5, 1921, in which we found the bowel anastomosis well healed, stomach stoma closure perfect and pylorus negative. Embedded gall-bladder and mildly inflamed appendix were removed.

Peptic ulcer following gastro-enterostomy was first reported by Braun in 1899. Kocher operated his first case in 1901, which was then the seventh case in history, as reported by Terry. Mayo Robson reported his first case in 1904. Since then there have been added a considerable number of cases with many valuable scientific contributions. Some stated facts of earlier contributions have had to be revised and some have become obsolete because of different types of gastro-enterostomy performed.

The ulcer may be situated in three areas anatomically: (1) On the gastric side of the anastomosis; (2) On the suture line; (3) In the proximal limb, distal limb or mesenteric border of jejunum. By far the greater number appear on the suture line.

No distinction can be made as to percentages of ulcers following anterior or posterior gastro-enterostomy.

Lieblein, in 1915, reported the known cases of jejunal ulcer and quoted statistics by Roojen, giving the incidence of jejunal ulcer as 1.3 per cent; while Patterson in his statistics quotes a percentage of less than 2 per cent. It is quite impossible to arrive at definite conclusions as it may be that all cases are not reported, are not diagnosed, or go to another surgeon for the second operation.



Fig. 1. Radiograph showing incisura at lesser curvature. Spasm at stoma. Barium in crater ulcer and the barium laden threads.

No period in life seems exempt, although statistics are placed to show that 85 per cent occur between the ages of twenty and fifty years. According to Roojen, the youngest case was 2 months old and operated for hypertrophic pylorus stenosis.

The great predominance of male over female is striking, being the same in marginal or jejunal ulcers. Patterson claims that 78 per cent, Roojen 79 per cent and Petren 84 per cent occur in men.

This is explained by the fact that, for instance, in the clinic of Rotgans 76 per cent of primary gastro-enterostomies occur in men while Roojen reports his statistics of peptic ulcer following gastro-enterostomy as 76 per cent in men to 24 per cent in women.

In the cases that had a chemical stomach analysis the majority showed a hyperacidity previous to the gastro-enterostomy. Following these up we find that in the majority of cases there is no change of acidity after the gastro-enterostomy and, following the operative procedure for jejunal ulcer, the acidity again remains the same as before the operation in a great proportion of cases. Judd mentions that the acidity is high after gastro-enterostomy in 60

per cent of the cases. So the analysis of the acidity depends a great deal on the length of the time after the operation. Lieblein draws the following conclusions: "Even though the hyperacidity, especially an excess of HCl, is a frequently recurring finding in the stomach analysis of the cases of peptic jejunal ulcer, it cannot be declared constant."

The interval of comfort varies considerably. In a series of seventy-five cases of peptic jejunal ulcer 75 per cent began having clinical symptoms less than two years after gastro-enterostomy; in seven cases, three and four years; in five cases, four and five years; in one case, nine years and six months; another, ten years after gastro-enterostomy. Very early recurrences are reported, as—two days after operation the patient complains of a new pain, in which a perforating ulcer is found 16 days after operating. This case is reported by Cackovic. Another was free from distress only ten days. Collins reports perforative ulcer six weeks after gastro-enterostomy. But these few known early cases are indeed a very small proportion of a large number of gastro-enterostomies performed.

PATHOLOGICAL ANATOMY

Although a large majority of cases have only one ulcer, reports show cases of two ulcers, some four, and in two instances even five ulcers, all situated in the immediate vicinity of the gastro-enterostomy opening. When there is a jejunal ulcer extending over a long period of time there is an induration in the surrounding tissues and the ulceration extends deeper into the wall and from here extends to the contact tissues and the neighboring organs. It may extend into the mesentery, into the retroperitoneal tissues, to the abdominal wall or onto the transverse colon as in our case. It may perforate into the colon and establish a jejuno-colic fistula. A number of such cases are reported and have been operated but are associated with a high rate of mortality. Where the extension is toward the abdominal wall, a large, inflammatory tumor is produced and can be palpated under the left rectus muscle. This is most frequent in the anterior gastro-enterostomy. The fact that an ulcer may heal spontaneously is proven in the cases of jejuno-colic fistulae in which no more ulceration is present, and in some of the narrowed gastro-enterostomy openings, where, because of the healing of the ulcer, the opening has become narrowed.

Roojen distinguishes five types of jejunal ulcer: (1) Ulcers with no symptoms, which heal ; (2) Ul-

cers with pronounced local and general symptoms; (3) Ulcers which produce an acute perforation; (4) Ulcers which, because of chronic adhesive peritonitis, develop tumefaction and inflammatory infiltration into the anterior abdominal wall; (5) Ulcers which develop into jejuno-colic fistulae.

Two cases are reported that have perforated twice in two years. Haberer, in 1918, reported that of his ten cases of jejunal ulcer following gastro-enterostomy none were on the anastomosis line but were in the proximal and distal leg and on the mesentery attachment. Haberer in his article states he has never seen a jejunal ulcer in cases where resection was made, frequently when the indirect surgical measures were used for duodenal ulcer and often when the pylorus was stenosed as in simple gastro-enterostomy. But in a recent communication he reports having just operated for jejunal ulcer in a case where pyloric resection had been made, his only case. Haberer states in his conclusion that all jejunal ulcers, post-operative, were in gastro-enterostomy with the shortest loop.

DIAGNOSIS

There are two outstanding questions which constantly confront us in these ulcers: (1) By what symptoms are we to recognize these ulcers? (2) What causative factors are at work producing these ulcers?

The symptoms as stated by various writers may be summed up as follows: (1) Pain after food or without food; (2) Pain usually at night; (3) Pain of a cramp nature; (4) Pain in epigastrium and to left of navel and left rib border; (5) Vomiting blood or blood in stool.

Lieblein states that symptoms may begin any time from a few months to several years after gastro-enterostomy. The ulcer may remain as a simple ulcer over a varying period, even years, but very often it takes on more serious aspects.

When a jejunal ulcer perforates, it is difficult to establish the site. A general peritonitis results, in which case the hole must be found at operation. Where a tumefaction has formed to the left of the navel and toward the left rib border, the diagnosis should be recognized in view of the history. Pain may radiate to the back and to the region between the shoulder blades. The relation of pain to the food intake is variable and does not offer anything constant. In one case food may bring on pain, in another relieve it, while in some pain is by day



Fig. 2. Radiograph after operation, showing ring of end-to-end anastomosis of jejunum.

and others especially at night. Then the jejuno-colic fistula can be recognized by various symptoms such as the vomiting of blood and passing of black stool. In those cases of jejuno-colic or gastro-colic fistulae in which a chain of symptoms develop with colicky pain in the stomach or to the left of navel, with a diarrhea that resists every remedy, at times a fecal vomiting and fecal belching, with a rapid appearance in the stool of recently eaten food, weakness and rapid loss of weight, we have indications of a short circuiting into the colon. The jejuno-colic fistulae occur always with a posterior gastro-enterostomy. Various methods of diagnosis have been used. Eiselberg gave an enema of methylene blue and recovered the color by the stomach tube, Kaufman used an enema that contained lycopodium colored with gentian violet, Polya does not consider this method as absolute for he says that there might be a valve action at the gastro-enterostomy opening which would forbid an enema entering. Lieblein and Polya both hold to the roentgen ray examination of the opaque meal entering the transverse colon directly from the stomach. Eiselberg also used a unique method of inflating the colon with air through a rectal tube and then with the screen observing the stomach inflate.

In reference to the roentgen ray diagnosis of marginal or jejunal ulcers, Lieblein feels that the roentgen ray examination offers a diagnostic aid only when a stenosis has formed or when the ulcer has penetrated into another organ which would give us a Haudek's niche. A slow emptying may mean beside a stenosed gastro-enterostomy opening, a narrowing of the distal jejunal limb because of the jejunal ulcer. Carman and Balfour, in an interesting article on jejunal ulcer dealing with the roentgenologic phase especially, say, "It would appear that in nearly all the cases there are definite roentgenologic indications of an abnormal condition, and that in many instances there are more or less direct signs pointing to the location of the trouble."

In our case the findings were quite definite when properly interpreted. There was the penetrating ulcer filled with barium which remained filled in successive pictures, and a constant incisura on the lesser curvature opposite the site of the ulcer which I have not seen mentioned in the literature. Also, what can be interpreted as two threads with barium clinging to it may plainly be seen. Neither have I seen this mentioned. The threads show on the side of the stoma opposite the ulcer. This fact was revealed at the operation when two threads, situated at the right side of the margin, were removed while the ulcer was in the proximal limb of the jejunum on the left side of the stoma.

The etiological agents may be summed up in the following: (1) Faulty technique in controlling bleeding which may cause a hematoma followed by infection and ulcer (W. J. Mayo shows, by a drawing, a case of this kind); (2) Unneutralized acid chyme; (3) Non-absorbable suture material for inner sutures; (4) Too much clamping of tissues or a Murphy button; and (5) Infective agent.

Mayo Robson was an early exponent of the bacterial infection theory. Neuman laid great stress on the mycotic theory. Lieblein brings out the point that the gastric retention, in those cases where there is a pyloric stenosis, where the gastric secretions have been altered over a long period, may be a causative factor in producing an ulcer in a traumatized portion. Lenander Key and Judd each reported a case of jejunal ulcer following gastro-enterostomy for pyloric carcinoma. All other gastro-enterostomies were done for some benign condition. Further causes may be mentioned such

as patients of the working class who have not time and opportunity to care for themselves for a sufficient time following the operation or do not follow out a prescribed order of diet. Abuse of intoxicating drinks is mentioned in the literature.

The arguments that have been advanced in favor of acid chyme as an etiological factor are, that they occur seldom in pyloroplasty and in cancer, and that this portion of the bowel is accustomed to a neutralized or alkaline medium. Terry, in collecting 155 cases, found only one case following gastro-enterostomy for cancer and gave two reasons: (1) less acid chyme; (2) patient does not live long enough.

Another factor is brought out by Lieblein when he calls attention to the lack of anti-pepsin ferment in the blood in case of ulcer of the stomach and duodenum and the localized absence of anti-pepsin ferment in the sutured area due to circulatory disturbance. The cell death by HCl and this followed by pepsin digestion is the dictum of Patterson. Wilkin concludes after animal experimentation and adding HCl to the diet that HCl is not a cause for ulcer formation and that the mucosa heals in seven days. Solid food, trauma and non-absorbable suture delay healing. Other experimenters declare that HCl is the cause. Terry takes the position that the acid chyme is of prime importance as causing ulcer formation following gastro-enterostomy.

Mayo reports that Rosenow has found an interrelation between apical tooth abscesses and gastric ulcer. Erdman reports finding, in duodenal ulcers, evidences of syphilis in two out of five cases and suggests that this may be a factor to include in the ulcers following gastro-enterostomy. Horsley says, in speaking of Rosenow's hematogenous infection, "It is also probable that at the time of the origin of the ulcer, the hematogenous infection produced irritation or inflammation in the gall bladder, appendix, pancreas, kidney and other organs, and the ulcer is merely a survival of multiple lesions."

Terry and Lewisohn report not having found linen or silk threads in the suture line.

Diarrhea is mentioned by Erdman.

Haberer states in a personal communication, "There is no doubt that there are individuals who have a special disposition to ulcer formation."

Lieblein mentions the possibility that non-absorbable suture material may cause a disturbance in wound healing, but of greater moment he holds the

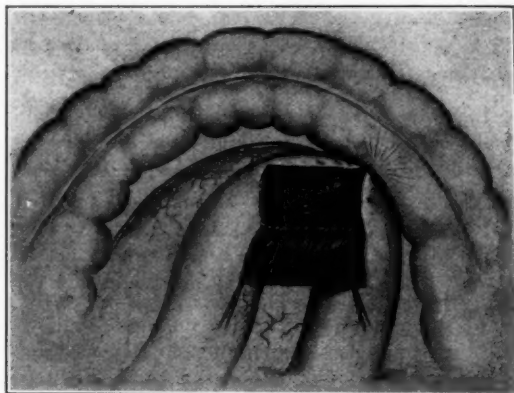


Fig. 3. Drawing showing the jejunal ulcer in proximal limb and attempted perforation into colon.

trauma produced when using a Murphy button. An argument to show that we must look for causes for these ulcers other than the suture material used, is the fact that throughout the literature it is seldom we find recorded that an ulcer forms after a pyloroplasty or Finney's operation. Ware thinks the non-absorbable suture a factor in ulcer production. Terry is of the opinion that non-absorbable suture is much to blame for the ulcers but found no sutures in the three cases he reported. Judd, in reporting 111 cases of the Mayo Clinic recently, notes having found threads in 26 cases. Sistrunk found threads in one case but no ulcer. Ochsner, in a discussion, says he uses silk suture in all his cases but he thinks the anastomosis should be made at the lowest point in the stomach. Carman and Balfour report having found threads in six out of thirteen cases. Gronnerud of Chicago, in 1917, in 5,000 animal experiments found ulcers quite frequently when non-absorbable suture was used. He concluded, "Ulcers of the jejunum following gastro-enterostomy were caused almost exclusively by non-absorbable sutures." Sutton, a few years ago, gave the opinion that, "There is very little evidence available for the incrimination of silk or linen threads." Haberer claims foremost among the technical errors the non-absorbable suture which increases the tendency of ulcer formation. Horsley also points out that non-absorbable sutures are used in pyloroplasty and in intestinal suture without producing ulcer.

Sutton, in an article on jejunal ulcers, makes the observation on one of his cases of perforating jejunal ulcer, seven years after gastro-enterostomy, that the portion of jejunum involved in the loop

was thinned out, had become attenuated and lost its valvule. It took on an appearance of the first portion of the duodenum.

Experiments by Gould and Harrington on animals showed that no matter how well the suturing was done, necrosis first occurred and later healing. However, Patterson and Lieblein claim that in the human, healing may be primary, and no doubt often is, but in some cases this may not be complete and in this way lay the foundation for an ulcer.

Several workers champion the circulation theory that the cutting of blood supply, rough handling of tissues, kinking of the mesentery, and the altered position of the jejunal loop are factors. C. H. Mayo, Judd and others lay little stress on trauma as an etiological factor, for surgeons have found all sorts of sharp material in patients' stomach and also greater difficulty would be experienced in wound healing in gastrotomy or gastro-enterostomy.

Horsley thinks the best results are obtained when gastro-enterostomy is done for pyloric stenosis, for then the duodenal contents are not neutralized by the stomach contents passing through the pylorus.

Haberer, of Innsbruck, in a personal communication, writes, "My views have remained the same in general, but the thought constantly arises that the ulcer-bearing pylorus, which is left, especially when it is blocked artificially, constitutes a chief danger for the later appearing jejunal ulcer." Lieblein and Eiselberg strongly support this contention.

Moynihan of Leeds, in a personal communication, states, "I am not at all sure as to the cause of jejunal ulcer, for probably many factors are at work, among the most important being: (1) a continuance of the septic poisoning; (2) persistence of suture material; (3) hyperacidity; (4) technical defects, such as imperfect approximation of the mucosa, development of a hematoma and the employment of too many sutures which devascularize the suture line."

Lieblein, of Prague, in a recent letter, takes a more specific stand as to etiology. He makes a distinction between the marginal and jejunal ulcer, stating, "The ulcer on the anastomotic ring certainly has its origin in the technical error of proper adaptation or necrosis of the mucosa from sutures pulled too tightly and this followed by digestion

in the presence of gastric secretion." He lays no stress on the non-absorbable suture nor the applied clamps, saying that a surgeon naturally uses his judgment as to the amount of pressure applied. As to the etiology of jejunal ulcer he feels that the chief cause is the acid chyme which is entirely foreign and abnormal to this part of the bowel. This now seems scarcely plausible when only 1.5 per cent of gastro-enterostomies are complicated by ulcers.

THERAPY

A thorough, well regulated medicinal therapy is advisable. Lieblein wishes to impress the value of internal medication in citing a case of a large inflammatory tumor, treated medically, with rest in bed, hot moist fomentations, atropine, and ulcer diet. He had a complete cure.

In the perforated ulcer the same rule holds as in any perforation, closing over the ulcer and suturing onto it a piece of omentum. Should a perforation occur in the presence of a large, inflammatory tumor it would be advisable to insert a drain and in this way establish a jejunal fistula (as advised by Lieblein) and only when conditions are very favorable, to attack the tumor mass. Only surgery has anything to offer for the jejuno-colic fistula. Where it is feasible to separate the false communication between the jejunum and colon, or stomach and colon, as the case may be, both openings should be sutured. Such a procedure with success has been reported by Eisenberg, Lyon and Polya. Others, who found it necessary to do more surgery, such as colon resection or other anastomosis either by suture or Murphy button, had fatal results. Spassokukozki found it necessary to make an extensive resection in one case of part of the transverse colon, the jejunal loop and a portion of the stomach, reuniting the wounds of the stomach, colon and jejunum, releasing a gastro-enterostomy and re-establishing a normal passage through the pylorus, as this was healed; the patient recovered but unfortunately he had a recurrence of symptoms at the pylorus. Lieblein says, "The re-establishment of normal conditions should only be considered if the primary condition is fully healed." This was the situation in our case.

Curretting the ulcer has failed. Establishing a jejunostomy also has not succeeded in diminishing the gastric secretion when food was taken. Lieblein says, "It is a mistake to think that a jejunostomy can eliminate the stomach functionally."

Of the more radical operations are mentioned the excision of the ulcer, removal of the ulcer bearing bowel (either the jejunum or transverse colon or even a part of the stomach), release of the gastro-enterostomy and re-establishment of the original route, or a second gastro-enterostomy with entero-anastomosis.

The difficulty was met with in our case when the gastro-enterostomy was released and an end to end anastomosis done, that a short loop had been used so it was embarrassing to get sufficient jejunum in the proximal limb to make the anastomosis.

Some authorities state that following the radical operation for jejunal ulcer 50 per cent of cases have more or less recurrence of symptoms. Concerning the therapeutics Lieblein concludes with this advice: (1) The gastro-enterostomy should be done only for definite indications; (2) Prophylaxis for jejunal ulcer should be continued over a long period.

In his communication of May 5, 1921, regarding the treatment of jejunal ulcers, Moynihan writes, "I have had a good many cases lately and so far have treated all but one of them by gastrectomy, removing the stomach to a point proximal to the anastomosis."

In perforated jejunal ulcer the mortality is 75 per cent, being much higher than that of the perforating gastric or duodenal ulcer. In operating for a jejuno-colic fistula the mortality is stated as 39 per cent, while with the inflammatory tumor formation a rather favorable prognosis is offered.

CONCLUSIONS

1. Gastro-enterostomy should be done only on very positive indications.
2. Following gastro-enterostomy a long period of prophylaxis should be carried out.
3. Gastro-enterostomy should be performed with as little trauma as possible as herein lies a cause for the marginal ulcer.
4. Although the question of the suture is still in the balance, it is advisable to discontinue the use of non-absorbable suture material.
5. One factor in the etiology of jejunal ulcer lies in the new physiology of acid chyme impact on mucous membrane with alkaline habits.

I wish to express my sincerest appreciation to Sir Berkely Moynihan, J. Shelton Horsley, J. W.

Mayo and C. H. Mayo for the privilege of using their cuts for lantern slides, and to Victor Lieblein, Von Haberer and Sir Berkely Moynihan, for their valuable personal communications.

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DISCUSSION

DR. W. C. CARROLL, St. Paul: There has been a great deal written on this subject, and Dr. Schuldt in his excellent paper and review of the literature brings the subject up to date. I wish to coincide with what he has said, that gastro-enterostomy should be done only for diseases and not for symptoms, because a certain definite percentage of cases are followed by duodenal or gastric duodenal ulcers.

As to the causes of this condition, he has cited various theories, and perhaps all of them at times are factors. The chemical one is perhaps the most important and that brings up the point that our patients must be followed up after operation. They should not be dismissed after they leave the hospital and allowed to eat everything, but they should be put on a well regulated medical routine or diet. This should be kept on for a variable length of time, depending on the case.

Focal infection is a very important factor, and I do not think these patients should have their focal infections removed just previous to or just after gastro-enterostomy. That was brought home to me by a recent case of my own on whom I operated about a year ago, using cat-gut sutures; six weeks after the operation the patient had a number of abscessed teeth extracted. He was well up to that time, but right after the extractions he had a recurrence of his old symptoms, which did not yield to medical treatment and later led to operation, at which time a gastro-jejunal ulcer was found.

As to the diagnosis, a careful history is important. A recurrence of his previous symptoms with perhaps localization of the pain to the left of the middle line instead of to the right, is always suggestive. Carman states that the best method in making a differential diagnosis is the x-ray.

The complications that occur have been mentioned, and most important is the gastro-colic fistula. Dr. Judd has recently pointed out a way to avoid this complication by suturing the mesocolon higher up on the stomach after doing a gastro-enterostomy; that is, keeping it away from

the line of anastomosis where it used to be sutured, as the scar tissue pulled the colon down.

There is no series of cases reported where the medical treatment has been used. However, I think Eusterman states that every case, if seen early, ought to be given the benefit of medical treatment.

Unquestionably the avoidance of traumatism at the time of operation is very important but I do not think it plays as great a part as some believe because the men who are using clamps and doing a great deal of work are still continuing to use them. Suture material for a while was thought to be the most exciting factor in the production of gastro-jejunal ulcer, but in a recent article in the *Journal of the American Medical Association* quite a number of cases are reported and in not a single case was a silk or linen suture used.

The most important point is the prevention of these ulcers and this is best accomplished by closely observing these patients after operation, and insisting on their learning how to take proper care of themselves and to follow the proper diet.

DR. J. FRANK CORBETT, Minneapolis: I would like to report a rather unique case. A young man, who had duodenal ulcer, bled profusely, and after a gastro-enterostomy was done, was much better for a little time; then he had another hemorrhage, followed by another operation, with excision of the ulcer with cautery; another hemorrhage. When I saw him his hemoglobin was so low that we could not measure it. The striking thing about the case was the delayed coagulation of blood. The blood hardly coagulated. I gave that man 10 c.c. of blood in the vein; at the end of six hours more 10 c.c. and at the end of 48 hours I gave him a good transfusion, after which the bleeding stopped, and the coagulation time was normal. He was put on medical treatment. He improved so that it looked as if he was going to get along all right. Within a comparatively short time a little bit of blood came in the stools. Dr. Graves gave him 2 c.c. of blood and the occult blood disappeared from the feces, and today, after a period of four or five months, the patient is apparently cured. I thought the case was sufficiently interesting to report it.

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Vol. V

April, 1922.

No. 4

EDITORIAL

Duluth and Saranac

Elsewhere in this journal is a statement prepared by Dr. A. T. Laird, superintendent of Nopeming Sanatorium, St. Louis County, showing a comparison of the climatic features of our Lake Superior region with that of the justly famed Saranac Lake. It was Trudeau who made the Adirondacks popular, and not the exclusive qualities of that mountain region. Many of the earlier Minnesota doctors will recall the fame in which Minnesota was held as an early health resort; and not a few doctors came out here from the East, either on account of their own health or threatened tuberculosis in their families.

It is not to be presumed that Saranac Lake and Duluth are the only regions heavily endowed with natural advantages assisting in the cure of tuberculosis. Our nation is rich in variety, and opportunities abound. Yet, in recent years, Minnesota has allowed other states, with less advantages, to supplant her in popular estimation; Minnesota's climate, and particularly that of the Lake Superior region, has been most seriously maligned. For some of this we can thank the straw hat and the ubiquitous B. V. D.: A man starts on a vacation in a sleeper, gets up in Duluth, dons his light togs, greets a delightful and stimulating zephyr from the greatest fresh water body extant, and, because

his unaccustomed femoral epiphyses set forth a clatter that clouds his cerebration, he forgets that almost every day is windy in Kansas, that the sun exposes itself only occasionally in Chicago, and that Duluth's average day and night the year around is not far from ideal. The figures presented by Dr. Laird are gratifying to Minnesota.

Trudeau's was a spiritual accomplishment; in the burning out of his own life from tuberculosis he created a glow of hope that has flashed around the world and will continue with that mysterious permanence granted only to those who have climbed the mountain and beheld the light unmasked. What he saw he inscribed in the minds and hearts of his followers, and, even as Moses, he wrote into the very stones that formed the structures that now dot our land and have robbed tuberculosis of much of its horror and more of its suffering.

Not the least among Trudeau's followers has been Longstreet Taylor of Minnesota. Even New York State has not accomplished as brilliantly as Minnesota, and credit is largely due to Taylor for fighting the early battles and stabilizing the sanatorium idea among us.

The death rate from tuberculosis in Duluth in 1910 was 129.8 per 100,000 of population; in 1920 the rate had been reduced to 84. Other associations feature Minnesota's natural and acquired resources; we who know the most about it should boldly feature the matters pertaining to health. E. L. T.

Tuberculosis

Since pulmonary tuberculosis has for so many years and until very recently headed the mortality statistics of civilized nations as the most destructive agent of human life, it is rather remarkable that its recognition is still a stumbling-block to many physicians. The importance of an early diagnosis, both to the patient and his family, is conceded. Nevertheless, so many cases are not diagnosed until in the far advanced class that it is still a live question and one of perennial interest.

The disease itself, on account of the insidious character of its onset, deludes its victims into the belief that they are not seriously ill, and do not require the services of a physician. In this class of cases, and their name is legion, the profession can in no wise be held responsible for the late diagnosis.

The number of unrecognized cases can be demonstrated in various ways, by autopsies of persons who have died of other diseases, or who have met violent deaths, which show an active or healed pul-

monary tuberculosis in a surprisingly large number of cases. Careful physical examinations of large numbers of men applying for the army or navy, routine examinations of employees, or life insurance examinations, frequently discover cases formerly unsuspected. Then again, the diagnosis of an incipient case of pulmonary tuberculosis is an exceedingly difficult one to make if the case is truly an early one. Physical examination of such a case can reveal but little, as the signs are not pronounced and easy of detection until actual destruction of the tissue of the lung has taken place. But given a young adult with vague and indefinite indications pointing to pulmonary tuberculosis, the chances are decidedly in favor of tuberculosis being present, since it is an exceedingly common disease at this age, and the profession should not hesitate to make a tentative diagnosis of pulmonary tuberculosis subject to the result of subsequent tests. The absence of tubercle bacilli from the sputum proves absolutely nothing, and their presence in the sputum shows that an early diagnosis has not been made. The profession is too prone to rely upon the laboratory report of the examination of the sputum almost entirely in making the diagnosis of pulmonary tuberculosis, to the exclusion of a careful study of the clinical picture presented by the individual case. Laboratory tests, "with the glamour of science and the romance of novelty," cannot supplant entirely the study of each individual with the sharpened observation due to long acquaintance with the danger signals.

The laboratory has proved itself of immense value to the profession, but like everything else is not infallible, and in the question under discussion has too often delayed a positive diagnosis, which should have been made by a careful analysis of the patient's symptoms and a painstaking exclusion of other possible conditions. We have to deal with a bacterial disease with a local expression and a number of constitutional manifestations which show the disturbed balance between the virulence of the pathogenic bacteria and the specific resistance of the individual. On the other hand, there are rare cases in whose scanty sputum tubercle bacilli may be found but whose chest is negative even when examined with the greatest care. The diagnosis must often be made in the absence of signs in the chest by the exclusion of other toxemic conditions that may resemble the symptoms of tuberculosis toxemia. These symptoms may not suffice for a posi-

tive diagnosis but they arouse suspicion and Pottenger has very wisely told us that the most important thing for the clinician is to know when to suspect the presence of tuberculosis.

The symptoms which should arouse suspicion of the presence of tuberculosis and lead to a thorough study of the case, are, first and foremost, cough, especially on arising in the morning, at which times there may be a few short coughs, with or without any expectoration. At the same time the patient may be conscious of a slight degree of debility, of the fact that he tires more readily than formerly, that he has lost a little weight, and that his dyspeptic symptoms have grown more annoying. The significance of hemorrhage is generally understood, as is a persistent tickle in the throat, which gives rise to cough accompanied by a slight hoarseness. A slight fever and rapid pulse, with or without chills, and sweating at night, point unmistakably to the necessity of thoroughly testing the patient for the presence of tuberculosis. The same is true of anemic conditions not otherwise accounted for, and of protracted convalescence from an acute disease. Although not a disease, yet pregnancy and labor come in under this category, and every woman with latent tuberculosis is especially liable to have it become active after childbirth. Many cases of tuberculosis masquerade under the name of influenza.

A tentative diagnosis of pulmonary tuberculosis should be made from the patient's history and symptoms, especially if the physician knows when to suspect its presence. Diseases which must often be excluded, such as neurasthenia, hyperthyroidism, chlorosis, typhoid and paratyphoid, malaria, focal infections, septic endocarditis and chronic bronchitis, all can be eliminated by patience and careful observation. Good x-ray stereo pictures can exclude many of these diseases, and are especially valuable as a means of corroborating a diagnosis. Since the use of the x-ray has become so universal, many more cases of neoplasms in the lungs have been recorded than ever before and one condition that has caused much confusion has thus been removed.

In doubtful cases, it is far better to suspect a patient of having tuberculosis, who is free from it, than to give a clean bill of health to one whose chest is negative but in whom tuberculosis is present.

H. L. T.

Eligibility of Delegates for the Presidency

In Section 3, Article IX of the Constitution and By-Laws of the Minnesota State Medical Association there is the following provision: "The officers of this Association shall be elected by the House of Delegates on the morning of the last day of the Annual Session, but no Delegate shall be eligible to any office named in the preceding section, except that of Councilor, and no person shall be elected to any such office who is not in attendance upon that Annual Session, and who has not been a member of the Association for the past two years."

In the session of the Fifty-third Annual Meeting some question was raised as to the wisdom of the provision. In the discussion it was stated that a precedent was established at the time of the election of J. W. Little to the Presidency in the meeting of 1915. In looking over the proceedings of the Society there is no record to indicate that Dr. Little was ever seated in the House of Delegates at that session. At the last session it was stated as a personal opinion of one Delegate that "At the next meeting of the House of Delegates someone should introduce an Amendment to the Constitution which will do away with this provision."

We feel that it is the duty of MINNESOTA MEDICINE as the official organ of the State Medical Society to call the attention of its members to these matters which are under discussion. The members should decide whether or not this provision works to the best advantage of the Society. If it does it should be adhered to and not be over-ridden by the members of any one House of Delegates. If it is not in the best interests of the Society the Section should be properly amended. We feel that the provision is a wise one and that it has as its chief argument the desirability of eliminating personal politics and trading from the House of Delegates. It hardly seems likely or possible that in any one year all of the members of the State Society eligible for the Presidency should be in the House of Delegates. The President of the State Society should be selected with a view to his personal fitness for the office after a thorough canvass of the situation by the membership of the House of Delegates. It is more likely that the problem would be given careful and unbiased consideration if every member of the House of Delegates realized that he were eliminated from consideration for the office. If any district society has a man whom it considers a desirable candidate for this office, it would be quite pos-

sible for it to make such suggestion or nomination through its Delegates. It would seem to be more appropriate if such a candidate were not a member of the Delegation. We believe the provision in the Constitution is a wise one and that it should be adhered to by the House of Delegates.

F. L. ADAIR,
For the Editing and
Publishing Committee.

The American Congress of Internal Medicine and Minneapolis Clinic Week

The annual clinical meeting of the American College of Physicians, known as the American Congress of Internal Medicine, is scheduled to meet in Rochester and Minneapolis this month. There will undoubtedly be members in attendance from all over Canada and the United States.

The purpose of the College is the standardization and elevation of internal medicine and the allied specialties, and the College bears the same relation to internal medicine that the American College of Surgeons does to surgery. Although a younger institution (this being the sixth annual meeting) there is little doubt but that the College of Physicians will before long hold up its end in the praiseworthy attempts instituted by the profession for raising the standard of practice of medicine in general.

The College of Physicians and the Congress of Internal Medicine are two rather distinct organizations, having separate constitutions and officers. Only members of the College, who, by the way, are entitled to affix the letters F. A. C. P. or M. A. C. P. to their names, are entitled to attend the meeting of the College held during the week of the Congress. Any member of the profession, on the contrary, who is a member of his local society may become a member of the Congress and attend the scientific meetings.

Minneapolis Clinic Week has been arranged for the following week (April 10-13). This arrangement enables visiting physicians to conveniently attend both meetings. The yearly growth in size and importance of this yearly clinic week, held under the auspices of the Hennepin County Medical Society, is too well known to require special mention. The great variety of clinical material offered by members of the profession recognized among the leaders of the profession in our state provides an invaluable opportunity for visitors. The program appears in this number of the Journal.

OBITUARY

J. E. Bowers, M. D., Duluth, Minn. Graduate of University of Michigan. Age, 80 years. Died February 23, 1922.

NEWS OF THE HOSPITALS

Miss Lynne Gilky has been appointed historian at St. John's Hospital, St. Paul. Miss Laura Herring, of the same hospital, has recently been appointed night supervisor.

Dr. O. F. Melby was re-elected president of the Oakland Park Sanatorium, Thief River Falls, at the recent annual meeting of the sanatorium board.

Drs. Plondke and Chatterton, of the staff of St. John's Hospital, St. Paul, recently read papers before the Cumberland, Wisconsin, Medical Society.

REPORTS AND ANNOUNCEMENTS OF SOCIETIES

THE ST. LOUIS MEETING OF THE AMERICAN MEDICAL ASSOCIATION

The arrangements of the St. Louis profession for the meeting places for the session of the A. M. A., which is to be held in their city May 22-26 next, are singularly fortunate and convenient; never has the association been so well favored in this respect. The district in which the meeting is to take place is at the west edge of the business section of the city, easily accessible from all directions by street car or otherwise and not more than fifteen minutes' street car ride from the most distant hotel. The grouping of the meeting places is so compact that should one walk from the Registration Building (Moolah Temple) to the farthest hall it can be done in ten minutes or less; from section to section is a matter of from one to five minutes. The convenience of the location and arrangements of the different halls is more outstanding than in any other city in which the association has met, and a decided improvement over the accommodations which were had at the meeting in St. Louis, 1910.

The Registration office, Post Office and Commercial Exhibit is to be in the Moolah Temple (Shrine), a beautiful and commodious building on Lindell Boulevard, two blocks west of Grand Avenue. At the other extremity of the group is the Odean, the home of the St. Louis Symphony Orchestra, with a main hall which seats better than 2,000, and several lesser halls. The main hall will be used for the opening session. Its acoustics are particularly good and suited to our purpose. The Sections on Practice of Medicine and of Diseases of Children meet here. In the assembly hall of the same building the Sections on Pharmacology and Therapeutics, and on Pathology and Physiology, will meet. (It will be noted that there has been an aim to foregather closely allied sections.) The Sheldon Memorial, a very beautiful new hall on Washington Avenue, one-half block west of Grand Avenue, which most admirably meets all requirements, will be the meeting place of the Sections on Ophthalmology, and

Laryngology, Otology and Rhinology. The Section on Surgery, General and Abdominal, and on Obstetrics, Gynecology and Abdominal Surgery, will be held in the Third Baptist Church on Grand Avenue, a situation well suited to the demands. The Sections on Orthopedics and Nervous and Mental Diseases will meet in the Law School of the St. Louis University, on Lindell Avenue, a few steps west of Grand. The hall easily seats 500 and is both comfortable and convenient. Dermatology and Syphilis and Urology will use the large Union Methodist Church, on Delmar Avenue, just west of Grand, which meets every requirement. The Sections on Gastro-Enterology, Proctology and on Preventive Medicine will use the large hall in the Musicians' Club on Pine Street, east of Grand Avenue, and next to the building of the St. Louis Medical Society, where the House of Delegates will hold its sessions. The Section on Stomatology is assigned to the assembly hall of St. Peter's Parish House, one block west of Grand on Lindell. Immediately in this district will be found three of St. Louis's most important clubs, the St. Louis, University and the Columbian. Restaurants catering to every grade of patronage are numerous in the district and precautions have been taken to insure that normal rates continue during the meeting.

The St. Louis profession is preparing for an unusual attendance; hotel reservations are coming in rapidly, but it is purposed that even the late comer shall be comfortably housed. The wise traveler, however, makes his reservation as early as he finds it possible. Dr. M. B. Clifton, 3525 Pine Street, St. Louis, is Chairman of the Committee on Sections and Section Work.

MINNESOTA STATE MEDICAL ASSOCIATION

October 11, 12 and 13, 1922

Minneapolis, Minn.

OFFICERS

J. Frank Corbett, M. D., Minneapolis.....President
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E. K. Green, M. D., Chairman, 808 Physicians & Surgeons Bldg., Minneapolis, Minn.

E. M. Jones, M. D., Secretary, 1014 Lowry Bldg., St. Paul.

Section on Medicine—

J. G. Cross, M. D., Chairman, Donaldson Bldg., Minneapolis.

David M. Berkman, Secretary, care Mayo Clinic, Rochester.

Communications regarding the coming meeting of the State Association may be addressed to either the chairman or secretary of the respective sections, or to the secretary of the Association, 403 Central Bank Bldg., St. Paul.

MINNEAPOLIS CLINIC WEEK

APRIL 10-13

Headquarters will be at the Radisson Hotel where visitors will register and receive daily programs and obtain any desired information relative to hospitals, clinics, etc.

Each morning will be taken up by clinical demonstrations in each of the hospitals. These will cover all of the branches of both medicine and surgery from the standpoint of diagnosis and treatment. Hospital demonstrations will be over at 2:00 P. M., and at 3:30 P. M. the afternoon meetings will begin. These meetings will be held at the Radisson Hotel. From 3:30 to 5:30 P. M. each day a symposium will be given on the following subjects:

Monday—Obstetrics
Tuesday—Pediatrics
Wednesday—Goitre
Thursday—Cancer

Special attention is to be paid to diagnosis and treatment and talks will be illustrated by lantern slide and chart demonstration and whenever possible by the patients.

At the close of the afternoon session the program for the next day may be obtained.

On Tuesday evening, April 11th, the Hennepin County Medical Society will hold its annual banquet at which a prominent visitor will speak. All out-of-town visitors are urged to attend. It is also understood that the Society of Ophthalmology and Otolaryngology will have an evening entertainment to which all are invited.

Entertainment for visiting ladies is being planned by the Ladies' Auxiliary of the Hennepin County Medical Society.

CLINIC WEEK PROGRAM

Radisson Hotel Hours: 3:30 to 5:30 P. M.

MONDAY, APRIL 10TH

Presiding—Dr. George D. Head

1. The Prospective Mother—Her Care...Dr. C. O. Maland
2. The Treatment of Pernicious Vomiting of PregnancyDr. R. T. LaVake
3. The Treatment of Eclampsia.....Dr. J. H. Simons
4. The Present Status of Operative Obstetrics.....
Dr. F. L. Adair
5. The Treatment of Puerperal Sepsis..Dr. C. G. Weston
6. The Differential Diagnosis and Treatment of DysmenorrheaDr. J. C. Litzenberg

TUESDAY, APRIL 11TH

Presiding—Dr. A. A. Abbott

1. Care and Treatment of the Premature. Demonstration of the Simple Home Apparatus.....
Dr. F. C. Rodda

2. Treatment of Constipation and Diarrhea in Infancy and Childhood. Demonstration of Practical Points in Stool Analyses.....Dr. Rood Taylor
3. Treatment of the Under-nourished Child. Practical PointsDr. N. O. Pearce
4. Treatment of the Nervous Child...Dr. E. J. Huenekens
5. Treatment of the Diseases of the Heart in Infancy and Childhood.....Dr. Max Seham
6. Drug and General Therapy in Infancy and Childhood.....Dr. F. W. Schlutz

WEDNESDAY, APRIL 12TH

Presiding—Dr. Robert Emmett Farr

1. The Endemic Goitre Problem—Prophylactic Treatment. Pictures and Slides.....Dr. George Fahr
2. The Röntgen Treatment of a Toxic Goitre. Lantern Slides and Pictures.....Dr. R. G. Allison
3. Surgery in Toxic and Exophthalmic Goitre.....
Dr. Jas. A. Johnson
4. The Heart in Toxic Goitre.....Dr. Olga S. Hansen
5. Correction of External Nasal Deformities. Demonstration of End Results in Patients..Dr. J. D. Lewis

THURSDAY, APRIL 13TH

Presiding—Dr. Archa E. Wilcox

1. Why We Need a Psychopathic Hospital at the University.....Dr. Arthur S. Hamilton
2. Differential Diagnosis between Constitutional Inferiority and Brain Tumor, with Demonstration of Patient.....Dr. W. A. Jones
3. Treatment of Ureteral Stone—Lantern Slides....
Dr. Gilbert J. Thomas
4. A Series of Radium Slides Illustrating the Results Obtained by Radiation in the Treatment of Skin Malignancy.....Dr. F. S. Bissell
5. The Meyer Operation and After-treatment of Club Foot—Lantern Slides.....Dr. Emil Geist
6. Surgical End Results in Gastropexia — Lantern Slides.....Dr. Ivar Sivertsen

SOUTHERN MINNESOTA MEDICAL ASSOCIATION

The midsummer meeting of the Southern Minnesota Medical Association will convene at Rochester, Minnesota, Monday and Tuesday, June 19 and 20, 1922.

The program for Monday and Tuesday forenoons will be clinical in character. All departments of the Mayo Clinic will give clinics and demonstrations at each hospital. The program for the afternoons of Monday and Tuesday will be scientific. The midsummer banquet will be held Monday evening, June 19, at the New Kahler Hotel.

OF GENERAL INTEREST

Dr. C. S. Ehrenberg has severed his connection with the Willmar Clinic, Willmar, and is now residing in Minneapolis, his former home.

Dr. Frank S. Schoonover, of the Mayo Clinic, was married at Fort Worth, Texas, on February 9th, to Miss Ann Maurice Simmons, daughter of Dr. and Mrs. Charles B. Simmons, of that city.

Dr. R. C. Adams, of Bird Island, has been spending some time in the Twin Cities, where he has been taking review work at the various hospitals.

Dr. Chester H. Clark, of Greenbush, has gone to New Mexico, where he will do surgical work in a large hospital for a few months. If he finds his work and the climate agreeable, he intends to locate there permanently.

Dr. M. P. Gerber, of Duluth, has joined the firm of Thabes, Badeaux and Nordin, of Brainerd.

Dr. and Mrs. T. Tennyson, of Minneapolis, are spending the remaining part of the winter in California.

Dr. H. B. Grimes, secretary of the Watonwan County Medical Society, has been elected mayor of Madelia.

Dr. Frank Lynam, well known Duluth physician, has been honored with an appointment from Herbert Hoover, head of the American Relief Association in Russia, as one of the six doctors to be chosen in the United States to go to Russia to carry on the relief work being done there. He sailed from New York March first.

The American Congress on Internal Medicine will meet in Rochester, Minnesota, April 3 to 6 inclusive.

The course in Public Health Nursing will be offered in the Spring Quarter, commencing March 29, 1922, at the University of Minnesota. Candidates should present a high school diploma or its equivalent. Applications for admission may be addressed to Miss Marion L. Vannier, Acting Superintendent, School of Nursing, University Hospital, University of Minnesota.

Ernest Harold Baynes, the well-known American naturalist, recently lectured before the Mayo Clinic staff in Rochester on the subject, "Our Animal Allies in the World War." In collecting material for this lecture, Mr. Baynes went abroad as a special correspondent for Harper's Magazine and spent eight months in Europe, Egypt, and Palestine.

Mr. Baynes is making a tour of the country lecturing in various cities on animal life. As a naturalist his contributions have been many and valuable. He is the founder of the American Bison Society, which has preserved the buffalo from extinction, and he has organized a large proportion of the various bird clubs in this country.

The Board of Governors have fixed on May 29 and 30 for the fourth annual meeting of the Association of Resident and Ex-Resident Physicians of the Mayo Clinic, the meeting to be held in Rochester. These dates immediately follow the dates of the St. Louis meeting of the American Medical Association.

Dr. Winford H. Smith, Superintendent of Johns Hopkins Hospital, and Dr. L. B. Baldwin, Superintendent of the University of Minnesota Hospitals, visited the Mayo Clinic and affiliated hospitals last month.

A group of officials from the Medical School of Columbia University and the Presbyterian Hospital of New York City visited the Mayo Clinic and affiliated hospitals last month. The visitors included Mr. William Sloane, President of the Board of Managers of the Presbyterian Hospital; Mr. Edward Harkness, Chairman of the Joint Administrative Board of the two institutions; Mr. James Gamble Rogers, Architect; Dr. C. C. Burlingame, Executive Officer of the Joint Board, and Dr. William Carrach, Dean of the College of Physicians and Surgeons of Columbia University. Plans are being completed for new buildings for the Medical School of Columbia University and the Presbyterian Hospital, and the committee was interested in seeing the clinic from the standpoint of construction, organization, and administration, with the view of gaining information helpful in completion of their plans.

Dr. R. S. Mussey of the Mayo Clinic has returned from a four weeks' clinical trip spent in visiting obstetrical wards of hospitals of the East.

Dr. Clinton R. Stauffer, Professor of Geology at the University of Minnesota and an authority on paleontology, gave an illustrated lecture, "The Ancient Reptiles of North America." The lecture was held in the Assembly Room at 8 p. m., under the auspices of the Mayo Foundation Chapter of Sigma XI.

Dr. Rosenow has returned to Rochester from Indianapolis, Indiana, where he attended a dinner given in his honor by the medical and dental societies of that city. Dr. Rosenow, who was the speaker of the evening, chose for his topic, "Experimental Results of Focal Infection and Elective Localization, and a Discussion of Their Clinical Significance."

Dr. and Mrs. W. J. Mayo, Dr. and Mrs. Balfour, Dr. and Mrs. H. S. Plummer, Dr. Lemon, and Mr. and Mrs. Kahler and daughter, Mary, left Chicago March 4, with Dr. A. J. Ochsner and his party for a month's trip in Mexico. En route to Dr. Ochsner's ranch, near the Pacific coast, the party will visit Mexico City, Guadalajara and Colima. They expect to return about April 2.

The Alpha Kappa Kappa Medical Fraternity of the University of Minnesota met in Rochester Saturday, March 4. A smoker and get-together was held in the University Club Rooms Friday evening at nine o'clock.

A clinical program was given Saturday followed by a banquet at the Hotel Kahler.

Dr. Wm. J. Kucera has returned to Hopkins after a six months' post-graduate course in Chicago and New York in diseases of the eye, ear, nose and throat.

The dates for the next two examinations of the National Board of Medical Examiners are as follows:

Part I and II, June 19, 20, 21, 22 and 23, 1922.

Part I and II, September 25, 26, 27, 28 and 29, 1922.

Applications for the June examination should be in the Secretary's Office not later than May 15th, and for the September examination not later than June 1st. Application blanks and Circulars of Information may be had by writing to the Secretary, Dr. J. S. Rodman, 1310 Medical Arts Building, Philadelphia, Pa.

A Public Health Institute was held at the University campus for one week during March under the auspices of the United States Public Health Service, the State Board of Health and the Medical School of the State University. This is one of a series of some twenty similar institutes which are being held at various centers throughout the country.

The program of this meeting included two distinct courses—one dealing with Venereal Disease, and the other with problems of Maternal and Infant Hygiene.

The following are the registrations for the first day:

	Clinics	Lectures only	Total
Course One	29	7	36
Course Two	41	18	59
	—	—	—
Total Registration	70	25	95

The personnel of the registrants included thirty-five physicians and sixty public health nurses and social workers.

The physicians showed most interest in the lectures and clinics on venereal disease, most particularly in the midday venereal clinics at the University and in the special clinics such as that on endoscopy.

The Maternal and Infant-Welfare Clinics attracted the larger registration among the nurses and social workers who attended the institute. Dr. F. R. Green, of Chicago, Secretary of the Council on Health and Public Instruction of the A. M. A., gave a public lecture on Monday evening at the East High School, Minneapolis, and also two forenoon lectures in the regular courses of the Institute.

The Minnesota Pathological Society of the University of Minnesota School, held an interesting meeting on the evening of Tuesday, March 21, 1922. Dr. H. L. Parker, of Rochester, and Drs. P. A. Ward and Hal Downey, of Minneapolis, presented papers.

The annual address of Alpha Omega Alpha Honorary Medical Fraternity was given by Dr. I. A. Abt, Professor of Pediatrics of Northwestern University, Wednesday, March 29th, at 8:15 P. M. in the Anatomy Amphitheatre, University of Minnesota.

The Wabash Railway announces that arrangements have been made with the Chicago Committee for special train service out of Chicago to St. Louis to the meeting of the American Medical Association to be held in St. Louis May 22nd to the 26th.

The special trains will leave Chicago at 11:45 P. M., Monday, May 22nd, arriving St. Louis at 7:45 A. M.

In addition the Wabash has four regular trains daily leaving Chicago as follows: 9:30 A. M.; 12:02 Noon; 9:20 P. M.; 11:45 P. M.

The rate authorized for this meeting is one fare and one-half for the round trip, \$31.11, from the Twin Cities, good going and returning via Chicago or going and returning direct via the M. & St. L. and Wabash. The round trip rate from Chicago to St. Louis is \$17.62. Sleeping car rates, Chicago to St. Louis:

Lower Berth	\$3.75
Upper Berth	3.00
Drawing Room	13.50

Reservations for berths on the special train can be made through Dr. Harger, 25 East Washington St., Chicago, who will hold the sleeping car diagrams for Minnesota delegates who desire to join the special.

CORRECTION

In reporting the personnel of the officers of the Hennepin County Medical Society, in the last issue of MINNESOTA MEDICINE, we inadvertently omitted the name of Dr. A. E. Hedback, who has been appointed first vice president.

MISCELLANEOUS

TO PHYSICIANS AND SURGEONS:

The members of the Industrial Commission are apprehensive that workmen suffering permanent partial injuries as the result of industrial accidents are not always receiving the proper amount of compensation to which they are entitled because the attending physician is not conversant with certain provisions of the Workmen's Compensation Act. We, therefore, call your attention to the following express provisions of Section 14 of the Act which relate to permanent partial injuries:

"The loss of the first phalanx of the thumb, or of any finger, shall be considered equal to the loss of one-half of such thumb or finger.

"The loss of one and one-half or more phalanges shall be considered as the loss of the entire finger or thumb."

Similar provisions are made for loss of toes.

"In all cases of permanent partial disability it shall be considered that the permanent loss of use of a member shall be equivalent to and draw the same compensation as the loss of that member."

We request that when reporting amputations you give the point of amputation and its effects on other parts of the member. When reporting loss of motion, give the various joints affected and the amount of loss in each, stated in percentage.

The Minnesota Supreme Court has ruled (Butch vs. Shaver, 184 N. W. 572), that in compensating for eye injuries correction by glasses must not be considered, but based upon the uncorrected vision which the accident may have caused.

Promptness and accuracy in making reports, giving the full details requested on our blanks, will aid in securing the prompt payment of compensation to the injured workman at a time when he needs it most.

Assuring you of our appreciation for past and future co-operation, we remain

Yours very truly,

INDUSTRIAL COMMISSION OF MINNESOTA,

By JOHN P. GARDINER,

Secretary.

PROCEEDINGS OF THE MINNESOTA ACADEMY OF MEDICINE

Meeting of February 8, 1922

DR. H. L. STAPLES, Presiding

DR. A. E. BENJAMIN presented the following cases:

CASE 1. Gastric Ulcer with Appendicitis. Mr. A. R., age 48, married, carpenter. F. H., negative. P. H., typhoid and diphtheria when young.

Present Illness. Pain in epigastrium past 4 weeks, gnawing in character, comes on 2 hours after meals. Acid foods aggravate. Other foods relieve. Eructations marked. Some pain and tenderness in right upper quadrant, radiating to back.

Examination. Poorly nourished. Two points of tenderness—epigastrium and gall bladder region. Hb. 80 per cent. Stomach acidity—66 total. Urine O. K.

Operation. Oct. 13, 1921. Right rectus incision. Retrocecal appendix removed. Ulcer $\frac{3}{4}$ inch in diameter on posterior wall of stomach, high and near lesser curvature. Gall-bladder normal except for a few adhesive bands. Lymphatics of gastrocolic omentum much enlarged. Stomach opened and base of ulcer cauterized. Abdomen closed in usual manner. Gastroenterostomy not performed because of location of ulcer, its size and possible malignancy.

Convalescence. Vomited once. Otherwise O. K. Gained 40 pounds in 6 weeks.

Present Findings. Feb. 4, 1922. X-ray evidence points to an hour-glass constriction in region of pars media due to old ulcer on the lesser curvature. Motility somewhat interfered with; obstruction not great. Not feeling as well the past two weeks. (Has been working right along.) Appetite not as good as previously. Meat seems to disturb him. Is somewhat constipated, and does not sleep well.

CASE 2. Duodenal Ulcer. Miss E. L., age 42, teacher. F. H., 2 brothers and 1 sister died of tuberculosis. P. H., operation for fibroids 3 months ago. Complete hysterectomy. Duodenal ulcer diagnosed by x-ray and at time of hysterectomy.

Present Illness. Pain in stomach, especially after eating acid foods, past 6-8 years. Has been quite constipated. Past few weeks has been worse. Has vomited several times with relief of pain. Has lost about 10 pounds in last three weeks.

Examination. Some ptosis and enlargement of stomach. 85 per cent retention of motor meal. Hb. 85 per cent. Weight, 114 pounds. Urine negative.

Operation. Feb. 1, 1922. Local, gas analgesia and small amount of ether. Midline incision above umbilicus. Ulcer found obstructing pylorus on duodenal side, great deal of scar tissue. Thought advisable to do a posterior gastroenterostomy. Posterior gastric wall adherent from perigastritis, making it difficult to get at stomach. Stomach was dissected loose and posterior gastroenterostomy performed with Eastman clamps. Inner edges were sewed with linen No. 0 sutures and outer edges with chr. No. 0 continuous (2 rows) with back lock stitch occasionally. Mesocolon stitched around gastroenterostomy just under jejunum. Cigarette drain placed below transverse colon. A rather thin peritoneum was sewed with plain catgut. Fascia and

muscle sewed with chr. No. 1 double. Skin sewed with No. 1 single.

Present Condition. Temperature and pulse normal. Vomited once following operation, but is now taking semi-solid diet.

CASE 3. Duodenal Ulcer, with Membranous Pericolicitis and Perigastritis. Mr. H. C., aged 37, laborer. F. H., negative. P. H., quinsy twice—years ago.

Present Illness. For 6 to 8 years. Dull pressure pain in pit of stomach 2 to 3 hours after eating. Food relief inconstant. Never tried soda. Some remissions, but no definite seasonal variation.

X-ray examination elsewhere in 1921, "duodenal ulcer." Operation elsewhere with removal of appendix, separation of adhesions, gave patient relief for two months. Vomited considerably for several days following operation and was greatly distended. Post-operative hernia and thin weak wall resulted. Comparative comfort from liquid or semi-solid foods when well regulated, but aggravated when working, and then vomiting was present.

Examination. Some tenderness in epigastrium. Blood pressure 122/70. Hb. 85 per cent. Urine, sugar, slight reduction, few hyaline casts. Blood chemistry normal.

Operation. Feb. 2, 1922. Ether anesthesia. Incision along old scar just to right of umbilicus, extending about 3 inches above umbilicus. Found ulcer with scar tissue causing obstruction at pylorus; ulcer not active. Adhesions around duodenum, liver and gall-bladder: these were separated and raw surfaces covered. Adhesions, also, extending along anterior abdominal wall for about five inches. Extensive membranous pericolicitis—double shotgun barrel arrangement. This was separated and sterile vaseline applied. Great omentum badly adherent down toward mesentery or root of transverse colon. These adhesions were also separated. Patient had a perigastritis at the greater curvature and anterior surface with adhesions. Posterior gastroenterostomy performed. The inner suture was of linen, the outer of No. 0 continuous chromic gut with back lock stitch occasionally. Jejunum dilated, mucous membrane redundant. Angles of gastroenterostomy thoroughly reinforced. Mesocolon stitched in a few places around opening. Cigarette drain placed below transverse colon. Peritoneum sewed with plain catgut, turning edges outward. Muscle and fascia sewed with chromic catgut imbricating rectus muscle. Fascia reinforced with silkworm sutures tied over gauze outside of abdomen.

Present condition: 6 days post-operative. Temperature and pulse normal. Considerable vomiting for 3 days following operation, relieved by gastric lavage. Some hiccoughs. Now taking semi-solid diet with no discomfort.

Discussion by DR. A. SCHWYZER:

The point that the doctor made, that these patients were eating on the 3rd day and making very little trouble, I think is one worth while discussing. It seems to me that if we feed them the proper things we can start feeding soon. In the last two weeks I have had two cases that were up walking about the ward before the week was up. If we give them food that causes no trouble, not too much plain sweet milk, but rather Bulgarian sour milk, they should do well. I have started in giving them this milk (and it probably helps keep the wound sweet inside) and I find that patients are very ready to take it. Setting

them up is a very important point. I once had a patient who vomited for 5 days and I was desperate; thought I might have to operate again to make a free passage, when as a last resort I had her sit up in a chair and gave her an egg, crackers, and liquids, and she stopped vomiting at once. I think it was getting her up in the vertical position that did the work, for, of course, the stomach would then drain better. As to an ulcer on the lesser curvature, that is a rather difficult problem. Is gastroenterostomy going to do any good? In some cases we can see wonderful results. Those are the cases that have a distinct pyloric obstruction. Then a drainage operation, of course, has a chance to do good. I remember one case that was operated on by one of us here a good many years ago and the wound was closed up again because the mass was thought to be an inoperable carcinoma of the pylorus. Then Dr. Dunn operated 6 months later and made the diagnosis of hypertrophic ulcer of the pylorus. Patient was well for 14 years and then came to me in misery. After a barium meal we could see far up on the lesser curvature a niche. When the barium meal had gone by, that niche was still full; 24 hours later it was empty, but, nevertheless, could still be recognized. The pylorus was impermeable and the old gastroenterostomy was nearly closed. A gastroenterostomy was made again and she has been well since that time, which was about 7 years ago. Not long ago I made a wedge-shaped excision of a large saddle ulcer on the lesser curvature and it was rather difficult to sew the parts securely. With cauterizing the ulcer and leaving it at that, without drainage operation, I have had no experience.

DR. ALEXANDER R. COLVIN gave the following cases:

1. A man, age 72, having previously been unusually well and strong, began to vomit. The vomiting became more and more frequent, so that finally a diagnosis of pyloric obstruction from carcinoma was made. When I saw him he was much exhausted and vomited frequently. Peristaltic waves occurring rhythmically could be seen traversing the stomach region. He had not any pain.

An exploratory incision under local anesthesia was made, and, except for the anomaly of the small intestine which I will show you, the only other finding was an indurated mass at the head of the pancreas. The stomach and duodenum were normal in appearance. At autopsy, 24 hours later, a perforating ulcer of the second portion of the duodenum was found. The base of the ulcer was formed by the head of the pancreas, and there was a good deal of inflammatory thickening around the ulcer region. It is rather remarkable that his symptoms had existed only for about one month, and that the symptom complex was practically that of high intestinal obstruction.

The small intestine of this man, after running in a normal manner for about 18 inches, became fused into a mat about 2 feet long. This terminated at the ileocecal junction. This mat, as I have called it, is composed of U-shaped loops of intestine, with a minimal amount of fatty areolar tissue between the loops. The mesentery proper was very short. I find, in Huntington's Anatomy of the Peritoneum, photographs of the intestinal tract of several lower forms of animal life, in which the intestinal canal conforms more or less closely to the condition in our case.

It is again interesting to note that this man never suffered from the anomaly.



The condition may well lead to speculative thought regarding the symptoms ascribed to kinks, etc., of our intestinal tracts.

CASE 2. A boy, age 7, was run over by an auto truck, and admitted to the City and County Hospital. I saw him about an hour after his injury. He complained of pain and vomited. His pulse and temperature were practically normal. He had a reddened area about 2 inches wide running across his abdomen from above at the left costal border down and to the right landing above the crest of the right ilium. Believing that the probabilities were that a visceral injury was present, the abdomen was at once opened. On opening the abdomen, casual inspection revealed a normal-looking peritoneum. On raising the omentum and transverse colon and exposing the duodenal jejunal angle, the jejunum was found to be completely cut through; one should say, perhaps, torn through. The mesentery of the distal segment was torn off for about 4 inches. The proximal segment was about 1½ inches long, and was denuded in part of its peritoneum.

The rather interesting feature was that practically no blood and no intestinal contents were found in the peritoneal cavity.

An end-to-end anastomosis was made after removing the 4 inches of the distal segment, which had been deprived of its mesentery. This was done with some misgivings, because of the doubtful condition of the proximal segment. At the end of 4 days, continuous vomiting of greenish and greenish black fluid persisted, and it was decided to do a gastroenterostomy. This was done and a catheter passed through the anterior wall of the stomach, down through the gastroenterostomy opening so that he might be immediately fed. He died 24 hours later.

At the second operation, upon inspecting the site of the anastomosis, a small amount of bile-stained fluid escaped, but there had not been any escape up to that time.

While a resident surgeon at the Royal Victoria Hospital, I saw an autopsy on a boy who had been crushed against

a fence by the hind end of a coal cart. There were no external marks of violence, but the jejunum was torn across at the same point as in the case just reported. A further finding was a circular separation of the intima of the abdominal aorta, without demonstrable injury to the external coats of the artery.

A few years ago I saw a young man who had been thrown from a horse, striking his abdomen against a tree. When seen he had symptoms of peritonitis. At operation, peritonitis was found and his jejunum torn through for half of its circumference.

In the first case reported, I fear that if my mind had not reverted to the autopsy seen as an interne, I might have overlooked the condition found because of the absence of any findings in the peritoneal cavity, except the torn bowel. For if a systematic exposure of this particular corner had not been made, the condition could easily have been overlooked.

Regarding the repair of the damage done, I feel that in all probability had the ends of the bowel been closed and a primary gastroenterostomy made, or an anastomosis made between the jejunum and the first part of the duodenum, the boy might have lived. He did not die of peritonitis. He died of exhaustion, or, if you like, a high intestinal obstruction.

Discussion by DR. DENNIS:

This case reminds me of a case I saw some years ago with Dr. Wheaton. It was a case of strangulated hernia. We were surprised to find a mass of small bowel just as this man's, about 8 inches long altogether. Strange to say, that man never had had symptoms before that and never any after. We decided not to free the lesions and he had no trouble whatever.

In connection with the case in which the small bowel was divided, I recall a case at the City Hospital of a boy who was injured in the same manner. I can't recall whether he was operated, but when he came to autopsy it was found that the duodenum had been divided retroperitoneally.

DR. BROWN: I would like to ask if this old gentleman had a large omentum. I have worked with the lower animals and we have found just such a condition in some of them. We found that in animals that have an umbilicus and have the intestinal tract below what corresponds to the navel in humans, that the segment corresponding to the small intestine is oftentimes folded back just as this is here. The mesentery is always short and close to the dorsal wall. As I recall, it occurs usually in long-bodied animals.

It seems to me that this may be a purely congenital thing that may have shown some atavistic tendency.

DR. SWEETSER: I would like to ask Dr. Colvin how long after the injury he operated on the boy. It is interesting to know how long before we would have a relaxation of the bowel.

DR. COLVIN: The boy was operated upon within 2 hours of his injury.

DR. FARR: I would like to mention two points in relation to this case. One point might be illustrated by the case of a boy who jumped off a truck and struck his abdomen against a post. I explored him within two or three hours and found the small intestine cut off, apparently

from having been impinged between his spine and the post. The ends of the intestine had not leaked at all but were contracted down, apparently tight. I looked up the literature at that time and found that many cases of this kind were reported. The gut ends are closed through Nature's effort to prevent leakage.

The other point relates to duodenal cases in which perforation cannot be easily repaired. In a case which I operated upon something over a year ago a thick indurated ulcer had perforated and it was impossible to close the defect. A clamp was placed on the other side of the ulcer and the whole mass quickly excised as the patient's pulse was over 160 and he was cyanotic. A stomach tube was passed and brought out through the pylorus, and moved down six or eight inches into the jejunum. The duodenum was then closed over the tube with a running suture of chromicized gut. This was done under local anesthesia and, although the patient was pulseless from the time of operation at 2 p. m. until 4 a. m. the next day, he made a good recovery. Hot water was poured into the jejunum in fairly large doses and had a marked stimulating effect. The ease with which one may sew the gut over a tube makes this method a great time saver.

DR. H. B. SWEETSER read a paper entitled, "The Management of Prostatic Obstruction."

Discussions by Drs. Dennis, Wright, Farr, Ritchie, A. Schwyzer, Benjamin, Colvin and L. C. Bacon. Dr. Sweetser closed the discussion.

DR. DENNIS: I think we will all agree with what Dr. Sweetser has said in regard to preliminary preparation. It is very necessary to prevent mortality. One point I want to bring up and that is the question as to whether we shall leave the catheter in after operation. It has always seemed to me that it was a good plan, because the prostatic urethra is very much larger at the time of operation and I make a practice of leaving it in in my cases. I had one case recently in which I did not do it. Later I thought it would be wise to pass a catheter and could not do it. Then tried a sound and could not get that through except by force. Then passed a larger sound. The only explanation that I can see for this is that the prostatic urethra healed in. I should like to hear from some other members as to whether it is a good plan to leave the catheter in. I can understand how it may tend to localize the infection. I am surprised to hear that Dr. Sweetser has had to pack only one case to check bleeding. It seems to me that the best method for holding the packing in place is to use a stiff tube. I was in Mankato recently and asked Dr. Holbrook about this. He told me he made a practice to pass a catheter and attach another tube to it. This gave him an opportunity to irrigate either way and it seemed to me a pretty good plan.

DR. FARR: Dr. Sweetser has covered the subject in such a sane manner that there remains very little to be said.

I have developed a few points which I stand by in handling this class of cases. I have not had a great many of them. Getting the patient into the proper condition is the most important point, I think all will agree. I have had one man of 82 and one of 87, and both recovered. The main point I wish to discuss relates to the anesthesia, and I wish to "take a chew" with Dr. Sweetser when he states that complete anesthesia cannot be obtained when local is used. To my mind this question permits of no argument now, for perfect anesthesia may be established if the

proper technic is used. In fifteen cases we have had one hundred per cent anesthesia in every case. Four ounces of .5 of 1 per cent procain in the caudal canal and a perfect infiltration of the abdominal wall will give perfect anesthesia in practically one hundred per cent of cases.

The acidosis question must be reckoned with in these cases and it is pretty definitely proven that novocain reduces the alkaline reserve less than does any other anesthesia.

I would also like to mention a few points in technic. First, air dilatation of the bladder. We empty the bladder before making a cystostomy, leaving the catheter in situ and attaching to it a rubber tube and bulb. The bulb is allowed to lie between the patient's feet. When the space of Retzius is exposed the bladder is dilated with air, and when the bladder is opened the patient is not deluged with water. We depend upon gravity for dilatation of the bladder after it is opened. The prostatic retractor is introduced from above and the rectal finger is unnecessary. It is surprising to what an extent the prostate can be mobilized above the abdominal wall before beginning its removal. Dissection may be made directly under the eye, as one would dissect tuberculous glands of the neck. We use the urethral catheter after operation only in cases that have used the lying-in catheter before operation, as we fear that it will cause infection unless the patient is accustomed to it.

Referring once more to the kind of anesthesia, I wish to say that although local anesthesia may not be the anesthesia of choice, it cannot be condemned upon the ground that good anesthesia cannot be established.

I would like to ask concerning Dr. Sweetser's experience regarding the accidental opening of the peritoneum.

DR. FRANK WRIGHT: The subject on which Dr. Sweetser has written is one that a man could talk about for three hours. I want to mention a few points. One is the amount of residual urine. Three ounces may back up into the kidney and a man gets constitutional symptoms. One man had a cystitis in which morphin could not control the pain. In certain cases of cystitis morphin aggravates the condition and does not control it, but produces tenesmus. I have always thought that the cystoscope was a dangerous diagnostic instrument to use on an old man. When you try to put a straight instrument through a urethra already curved you do more harm than it is possible to do good. I also had one patient who was catheterized three or four times and died from it. Answering his reference to Dr. Young's statement that the ejaculatory duct is not injured so much by suprapubic as by perineal operation, I would say that the ejaculatory duct is never involved. Many men forget that enucleation of the prostate is a dissection. Regarding the use of anesthesia, I would say that for a long time I used spinal anesthesia and used it very successfully, but gave it up promptly when we discovered that patients were not properly prepared before. If the bladder is drained before, we have no trouble with anesthesia. Regarding packing; the packing should be left in the wound. If it is once put in it should not be taken out but should be allowed to come out itself down into the bladder. I have seen death follow removal of packing. By doing this and taking the tube out in five days the gauze will be found loose in the bladder. The danger from sepsis is very greatly over-estimated. The tubes should be put in tightly to keep

the bed dry and should be left in for five days. If your drainage tube is loose the bed is wet and the patient uncomfortable. If it is too tight and there is pressure necrosis on the bladder you get a wound which heals slowly. The doctor speaks of the healing of the wound. When we enucleate the tumor the sheath will contract, and after healing it will cover with granulation tissue. I think it is unheard of that the walls of the posterior urethra ever unite so don't think it necessary to put in permanent drainage to prevent the urethra healing.

DR. RITCHIE: I think our very great satisfaction in this work has been the selection of the two-stage plan. I am familiar with all the arguments *pro* and *con*, and clinically I know of Dr. Wright's work at the University and have seen his satisfactory results by the use of the interrupted catheterization. I find in our own private work that this preparation very often insures a great deal of distress to the patients. Since we have been doing the two-stage operation we have lost but one case from uremia. In acute retention with bladder distended to fullness, we have often made a plan of doing the work in three stages, by first instituting suprapubic catheter drainage by means of a trocar, then the preliminary wound in preparation for the removal of the gland at the third operation. The first two procedures are done under local anesthesia, are of little consequence, give great relief, and I believe have a mental effect in giving confidence to the patient for the real operation. At the preliminary opening, the peritoneum can be easily misplaced and the dome of the bladder inclined to the front wall, thus minimizing the danger of dissecting the bladder in all directions during the later enucleation of the prostate. It is not always necessary to pack, but if there is any question we use the gauze. I was very glad to hear that Dr. Wright says not to take out the packing too early. We have delayed its removal, maybe sometimes too long. I think the urethral catheter is necessary as it guides the healing. The point is that this catheter must be well into the bladder beyond the prostatic wound. I think that doing the operation in two stages and treating these patients gently has revolutionized our mortality statistics and it will take a lot of argument to make us change.

DR. A. SCHWYZER: First of all, I agree with Dr. Farr that Dr. Sweetser's paper is full of very good judgment and common sense. I think there is not a single thing he said that one could in fairness greatly disagree with. As to the anesthetic, Dr. Farr gave his views that the local anesthetic is the one. However, he combines it with sacral anesthesia. I am very much in favor of local anesthesia. In the last three and a half weeks we have had three cases (one malignant papilloma of the bladder and two of the prostate) and used local anesthesia. Dr. Farr says he injects four ounces into the sacral canal. We used only local anesthesia. It is really remarkable how nicely one can inject around the prostate. We gave one patient about a tablespoonful of ether, more to give him something to think about, but it seems to me that the one spoonful of ether would be preferable to four ounces of anesthetic in the sacral canal. Now as to the handling of the case afterwards. When there is not any oozing to speak of we do not use any packing. Just put in a tube and sew the bladder around the tube and then the tube was removed in two or four days and a catheter inserted through the wound for a few days. One of these cases began to urinate after forty-

eight hours and one of the others after about four days, though they were still draining suprapubically. I think it should not be necessary to wait five days for the removal of the tube in a stereotype manner.

DR. RITCHIE: I might qualify my statement about the gauze. I felt that it should not all be removed at once. One might begin removing it on the second day. It is removed gradually rather than make a separate and complete procedure out of it.

DR. WRIGHT: Regarding the use of local anesthesia, there is no reason why you can't anesthetize the bladder. Regarding the packing, I leave the packing in on the same principles that you pack a wound on the surface. You would wait until granulation tissue had formed and it would come out without force. Hemorrhage comes from the vein, and if you dislodge the clot you start hemorrhage again.

DR. BENJAMIN: This has been a very interesting subject. There has been more disagreement about these cases than about any other. Decompression of the kidney by the catheter has given me better results I think than the two-stage operation. We leave the catheter in for several hours at a time several days beforehand to get the patients used to it. We use local and gas analgesia. Bleeding is checked by suture, as a rule. It obviates the necessity of packing. The catheter is left in afterwards. A suprapubic incision is made and a double tube, one within the other, is placed in the incision. A suture is passed through the inner end of the catheter and brought out between the two tubes and anchored to a cross piece over the short outer tube. It is not uncomfortable, and is a much better way than the old method. It also gives a chance to irrigate the bladder. I have followed this method for the last four years.

DR. COLVIN: Regarding the two-stage operation. It is undoubtedly wise if the patient is suffering from the effects of retention to drain his bladder first, and later remove his prostate. However, not every man who requires prostatic operation is suffering from toxemia or cystitis, and in cases not presenting these features, I see no necessity for a two-stage operation.

Regarding the selection of operative cases, not every man with his first attack of obstruction requires removal of his prostate. A temporary obstruction may be due to congestion and edema of the mucous membrane of the prostatic urethra. If this is relieved by appropriate treatment, the obstruction is relieved and no more trouble may be experienced for several years. If the subject is comparatively young, postponement of the operation is quite safe. If the subject is over 70, a year's relief may be all that his life requires. Apart from the danger of hemorrhage or the danger of operating upon debilitated subjects, there is that rather indefinable danger in genito-urinary operations, perhaps expressed best in terms of "suppression of urine" which is ever a menace in old and young.

The question of packing the wound at the bottom of the bladder. It is my feeling that the packing is efficient just as long as one holds it in place. If after a few minutes' pressure, bleeding is still active, the bleeding point should be sought for and controlled by a ligature or suture.

DR. L. C. BACON: The matter of oozing seems to take up so much attention. I have given up the use of gauze and have found the Pilcher bag very satisfactory. Sufficient

retraction can be made upon the catheter to take care of the oozing very readily and the urethral canal is kept open. I have been using that for several years entirely in place of packing.

DR. SWEETSER (closing the discussion): In wish to thank the members for their very general and free discussion. What I have tried to emphasize particularly is the necessity for preparatory pre-operative treatment if the best results and a low mortality are to be obtained. If the patient is brought to the operating table as a *safe* risk, the details of the operation are not so important, provided ordinary skill is used.

I will comment on only a few of the points brought up in closing. First, about the use of the in-lying catheter. If it is used as the sole source of drainage, the suprapubic wound being closed without a drain, then I think it is not efficient and should not be relied on. If the bladder is also drained through the suprapubic wound, then I think the catheter is unnecessary and may give rise to epididymitis. Stricture does not occur, and, if the patient is to recover the ability to urinate, he will do so whether or not a catheter is left in.

2. Dr. Wright said he had a patient who died from uremia just from passing a catheter. If such a trivial procedure may end so disastrously, how much more certain would be the fatality if a prostatectomy were attempted. Such cases prove the necessity for preparatory care to improve the renal function and eliminate the retained toxic products of metabolism.

3. Concerning the preservation of the ejaculatory ducts, I do not think we need worry, for these old men have usually outlived their procreative period; they may be sterile, but not necessarily impotent.

4. Regarding the drainage tube, the shorter its stay the quicker the fistulous tract will heal. When hemorrhage has stopped and granulation tissue has formed, it ought to be removed; 48 to 60 hours should be sufficient, and then the patient may get out of bed.

5. The question of anesthesia is very important. What I have said about local anesthesia does not apply to experts like Dr. Farr, but to the average man as we see it administered in our visits to the various clinics throughout the country. Further than this, general anesthesia, especially gas-oxygen, produces so little increased danger that I doubt if better results can be shown by even the most skillfully administered local anesthesia. As I have said in my paper, the operation is more likely to be thorough under general than under local, for, as Dr. Schwyzer says, even if the patient does not suffer pain, he gets restless if the operation is unduly prolonged, and this may cause the surgeon to quit before he is finished.

6. It was very interesting to note that everyone who discussed the paper employs the suprapubic method. Ten years ago there would have been no such unanimity. There is no question that the perineal route requires more accurate anatomical knowledge and greater technical skill, and even with these the disastrous sequelæ of fistula and incontinence may not be with certainty avoided.

7. I have not found the two-stage operation often necessary, and surely not the *sine qua non* claimed for it. If an in-lying catheter is tolerated (and it most often is) the patient can be brought into condition for a safe one-stage operation.

8. Accidental opening of the peritoneum is only dangerous when not recognized till after the bladder has been opened and the peritoneal cavity exposed to contamination. This may happen if the opening into the peritoneum is very small. But if its possibility is kept in mind and care exercised, the accident ought to be discovered and repaired before the bladder is opened.

9. Dr. Colvin mentioned that in a first retention where the urine is normal he feels it is safe to go ahead and operate. I would agree with him if he finds the renal function good. He also says that normal urination may be regained following catheterization, and that in such cases prostatectomy is not necessary. With this I cannot agree, as I think it is not possible to completely empty the bladder when the prostate is enlarged. If a sagittal section is made through such a bladder it will be found that the meatus internus is high, forming a cul-de-sac behind and below it. Even with considerable retention, many of these old men will go along and say they have no difficulty in urinating except that they are passing water too frequently. If a catheter is passed, however, there will be found retention, often of many ounces. This is the thing that is liable to trip us.

10. Regarding hemostasis, the Pilcher bag is good, but the difficulty is that you may not have it when needed, and even when you do have it, it may be defective and fall apart. Gauze tape is always available and is efficient. With the bladder widely open and the patient in Trendelenburg position the operative field is easily visualized and hemorrhage may be controlled. It is wise to be sure of your hemostasis before you dismiss the patient from the operating room.

HARRY P. RITCHIE, M. D.,
Secretary.

NEW AND NON-OFFICIAL REMEDIES

During February the following articles have been accepted by the Council on Pharmacy and Chemistry for inclusion in New and Non-official Remedies:

PERSSON LABORATORIES:

Bacillus Coli Antigen (No. 50)-Persson.
Furunculosis Vaccine Mixed (No. 37)-Persson.
Gonococcus Antigen (No. 47)-Persson.
Staphylococcus Aureus Antigen (No. 49)-Persson.
Streptococcus Antigen (No. 48)-Persson.
Pneumonia Vaccine (No. 36)-Persson.

POWERS-WEIGHTMAN-ROSENGARTEN CO.: Novarsenobenzol-Billon.

G. H. SHERMAN:

Whooping Cough Vaccine-Sherman.
Mixed Typhoid Vaccine-Sherman.
Acne Staphylococcus Vaccine-Sherman.

WINTHROP CHEMICAL CO.:

Alypin.

Animal Epidermal Extract Allergens-Squibb.—Powders representing the alkali-soluble protein from the hair and epidermis of animals or from the feathers of fowls. Animal Epidermal Extract Allergens-Squibb are employed for the diagnosis of asthma or perennial rhinitis. The patient's susceptibility may be tested in the same manner as that employed for pollen extracts. They are not intended for treatment. The following allergens have been accepted: Burro Dander Allergen-Squibb, Burro Hair Allergen-Squibb, Cat Dander Allergen-Squibb, Cat Hair Allergen-Squibb, Chicken Feathers Allergen-Squibb, Cow Dander Allergen-Squibb, Cow Hair Allergen-Squibb, Dog Dander Allergen-Squibb, Dog Hair Allergen-Squibb, Duck Feathers Allergen-Squibb, Goose Feathers Allergen-Squibb, Horse Dander Allergen-Squibb, Horse Hair Allergen-Squibb, Rabbit Dander Allergen-Squibb, and Rabbit Hair Allergen-Squibb. E. R. Squibb and Sons, New York (Jour. A. M. A., Feb. 4, 1922, p. 349).

Bacterial Allergens-Squibb.—Protein extracted from bacterial cells. Bacterial proteins have been used cutaneously for the diagnosis of anaphylaxis to the metabolic products from specific bacteria. Their utility is debatable. The following allergens have been accepted: Bacillus Coli Allergen-Squibb, Bacillus Pertussis Allergen-Squibb, Bacillus Typhosus Allergen-Squibb, Bacillus Catarrhalis Allergen-Squibb, Gonococcus Allergen-Squibb, Pneumococcus I Allergen-Squibb, Pneumococcus II Allergen-Squibb, Pneumococcus III Allergen-Squibb, Pneumococcus IV Allergen-Squibb, Staphylococcus Albus Allergen-Squibb, Staphylococcus Aureus Allergen-Squibb, Streptococcus Pyogenes Allergen-Squibb, and Streptococcus Viridans Allergen-Squibb. E. R. Squibb and Sons, New York (Jour. A. M. A., Feb. 4, 1922, p. 349).

Butyn.—Paraminobenzoyl- γ -maminormal butylamino-propanol sulphate. It is a local anesthetic proposed as a substitute for cocain, particularly in surface anesthesia, as for the eye, nose and throat. It has the advantage of acting through intact mucosæ almost as effectively as cocain. On the normal human eye, a 0.5 per cent solution of butyn is less effective than a 1 per cent solution of phenacain, but more efficient than a 1 per cent solution of cocain or a 1 per cent solution of eucain. Butyn has been used with success in practically all operations on the eye and in some operations on the nose and throat. Butyn is supplied in solution and also as Butyn Solution, 2 per cent; Butyn Tablets, 0.2 gm., and Butyn and Epinephrin Hypodermic Tablets. The Abbott Laboratories, Chicago.

Solution of Post-Pituitary G. W. Carnrick Co.—An extract of the posterior lobe of the pituitary body of cattle, standardized to have the same strength as liquor hypophysis U. S. P. For a discussion of the uses and dosage see New and Non-official Remedies under Pituitary Gland and Solution of Hypophysis. Solution of Post-Pituitary is supplied in 1 c.c. ampules. G. W. Carnrick Co., New York.

Pituitrin "O."—An extract of the posterior lobe of the pituitary of cattle, approximately $2\frac{1}{2}$ times the strength of solution of Hypophysis U. S. P. For a discussion of the actions and uses see article Pituitary Gland, New and Non-official Remedies 1921, p. 219. Pituitrin "O" is supplied in 0.5 c.c. and 1 c.c. ampules. Parke, Davis and Co., Detroit (Jour. of the A. M. A., Feb. 11, 1922, p. 431.)

Alypin.—The hydrochlorid of 2-benzoxy-2-dimethyl-amino-methyl-1-dimethyl-amino-butane. Alypin is a local anesthetic claimed to be equal to procain, but is not a mydriatic. It is said not to produce disturbance of accommodation and to be less toxic than cocain. But the evidence as to the relative toxicity of alypin and cocain is conflicting. Alypin is used in solutions having about the same strength as solution of cocain hydrochlorid. Winthrop Chemical Co., New York.

Novarsenobenzol-Billon.—A brand of nearsphenamine-N. N. R. Marketed in 0.6 gm. and 0.9 gm. ampules. Manufactured under license from Les Etablissements Poulenc Freres, Paris, and the Chemical Foundation, Inc. Powers-Weightman-Rosengarten Co., Philadelphia.

Whooping Cough Vaccine-Sherman.—*Pertussis bacillus* vaccine. (See New and Non-official Remedies 1921, p. 303.) Marketed in 10 c.c. vials. G. H. Sherman, Detroit.

Mixed Typhoid Vaccine-Sherman.—A typhoid vaccine (See New and Non-official Remedies, 1921, p. 310) marketed in 10 c.c. vials, each cubic centimeter containing 1,000 million killed typhoid bacilli and 500 million each of paratyphoid bacilli A and B. G. H. Sherman, Detroit.

Acne Staphylococcus Vaccine-Sherman.—A mixed vaccine. (See New and Non-official Remedies, 1921, p. 314) marketed in 10 c.c. vials, each cubic centimeter containing 40 million killed acne bacilli and 1,000 million killed staphylococcus albus. G. H. Sherman, Detroit.

Bacillus Coli Antigen (No. 50)-Persson.—A colon bacillus vaccine (See New and Non-official Remedies, 1921, p. 299) marketed in 20 c.c. vials, each cubic centimeter containing 1,000 million killed colon bacteria. Persson Laboratories, Mount Clemens, Mich.

Furunculosis Vaccine Mixed (No. 37)-Persson.—A staphylococcus vaccine (See New and Non-official Remedies, 1921, p. 306) marketed in 20 c.c. vials, each cubic centimeter containing 2,000 million killed staphylococcus aureus and 2,000 million killed staphylococcus albus. Persson Laboratories, Mount Clemens, Mich.

Staphylococcus Aureus Antigen (No. 49)-Persson.—A staphylococcus vaccine (See New and Non-official Remedies, 1921, p. 306) marketed in 20 c.c. vials, each cubic centimeter containing 3,000 million killed staphylococcus aureus. Persson Laboratories, Mount Clemens, Mich.

Gonococcus Antigen (No. 47)-Persson.—A gonococcus vaccine (See New and Non-official Remedies, 1921, p. 300) marketed in 20 c.c. vials, each cubic centimeter containing 3,000 million killed gonococci. Persson Laboratories, Mount Clemens, Mich.

Streptococcus Antigen (No. 48)-Persson.—A streptococcus vaccine. (See New and Non-official Remedies, 1921, p. 309) marketed in 20 c.c. vials, each cubic centimeter containing 1,000 million killed streptococci. Persson Laboratories, Mount Clemens, Mich.

Pneumonia Vaccine (No. 36)-Persson.—A pneumococcus vaccine (See New and Non-official Remedies, 1921, p. 304) marketed in 30 c.c. vials, each cubic centimeter containing 8,000 killed pneumococci, Types I, II, III and Group IV, in equal proportions. Persson Laboratories, Mount Clemens, Mich. (Jour. A. M. A., Feb. 25, 1922, p. 581).

PROPAGANDA FOR REFORM

Butyn, A New Synthetic Local Anesthetic.—A committee of the A. M. A. Section on Ophthalmology reports to the Council on Pharmacy and Chemistry on the clinical use of butyn in operations on the eye, nose and throat. The committee finds butyn preferable to cocain as an anesthetic in operation on the eye. One member of the committee also reports favorably on its use in operations on the nose and throat. As a result of the clinical and experimental use of butyn, the committee arrives at the following conclusions: 1. It is more powerful than cocain, a smaller quantity being required. 2. It acts more rapidly than cocain. 3. Its action is more prolonged than that of cocain. 4. According to our experience to date, butyn in the quantity required is less toxic than cocain. 5. It produces no drying effect on tissues. 6. It produces no change in the size of the pupil. 7. It has no ischemic effect and therefore causes no shrinking of tissues. 8. It can be boiled without impairing its anesthetic efficiency (Jour. A. M. A., Feb. 4, 1922, p. 345).

Willard E. Ogden, Specialist in Proctology.—Dr. Willard E. Ogden, Chicago, claims to be a specialist in proctology, author of "Improved Method of Treating Rectal Diseases," to have been associated with the leading proctologists of America, and to have developed a method of office treatment which is not taught by any other practitioner. He offers to instruct physicians in his methods. In 1914, Ogden advertised in Chicago newspapers to cure piles. In 1921, Ogden had a copyrighted mail-order course of the treatment of rectal diseases by improved methods. Careful search fails to disclose that Dr. Willard E. Ogden has ever distinguished himself in the practice of specialties in which he now wishes to instruct physicians, that he has never published a paper on any phase of medicine or surgery, or that he has been associated with the leading proctologists of America (Jour. A. M. A., Feb. 4, 1922, p. 368).

Mercuric Cacodylate.—As cacodylates have been found practically worthless in the treatment of syphilis, mercuric cacodylate must be considered as merely an administration form of mercury. It contains but one-half as much mercury as mercuric salicylate. The two preparations cannot be compared with each other as to local or general action for the reason that the cacodylate is soluble while the salicylate is practically insoluble. The cacodylate has to be administered daily to maintain adequate action. Mercuric salicylate is a favorite drug because of the argument that, being insoluble, it forms a depot of mercury in the tissues so that a week's dose may be administered at one time. To keep the patient under as continuous mercurilization as would be secured by the ordinary dose of 0.10 gm. of mercuric salicylate given once a week, six doses of 0.04 gm. of cacodylate would have to be given; in other words, a daily dose excepting Sunday. The pain and induration induced by mercuric salicylate is the price the patient must pay for the convenience of weekly administration (Jour. A. M. A., Feb. 11, 1922, p. 452).

Styptysate Not Admitted to N. N. R.—Styptysate, according to the advertising of Ernst Bischoff Co., Inc., is "obtained by dialysis from Bursa Pastoris (Sheppard's [sic] purse)." It is claimed to be "The Remedy for Hemorrhages," to be "Superior to Ergot and Hydrastis," "of particular advantage in Menorrhagia and Metrorrhagia" and to have been "found of great value in vesicle hemor-

rhages and hemorrhages from mucous membranes in general." According to the label, Styptysate is "made in Germany," but the name of the German manufacturer is not given. According to German publications, a proprietary called Styptysate and made from shepherd's purse—a common weed—was used in Germany as a substitute for ergot when this drug was not obtainable. On the assumption that the product discussed in German publications is the Styptysate marketed in the U. S., the best that can be said for it is that, during a shortage of ergot, it was used in place of that established drug. The Council on Pharmacy and Chemistry reports that Styptysate (Ernst Bischoff & Co., Inc.) is inadmissible to New and Non-official Remedies because its composition is semisecret and indefinite, and there is no evidence that its uniformity and strength is controlled; further, it is inadmissible because the therapeutic claims advanced for it are exaggerated and unwarranted and because there is no evidence that it possesses any advantage over established drugs, such as the biologically standardized fluid extract of ergot or the definite ergot preparations admitted to New and Non-official Remedies (Jour. A. M. A., Feb. 11, 1922, p. 450).

Iron Therapy.—Iron has so long been administered in some form or other in the treatment of anemia that one might well suppose that its function in the regeneration of blood had been clearly determined. This is far from being the case. Last year, Whipple, and his associates, reported that iron given as Blaud's pills had no influence on the rate of blood regeneration in secondary anemia produced in animals. They reported that there is some experimental evidence for the administration of blood in secondary anemia, but state that whole red cells or hemoglobin given by mouth in the form of a dry powder do not appear to influence profoundly the blood regeneration curve. Their experiments show that hemoglobin has a distinct influence on blood regeneration, but not sufficient to warrant its use in uncomplicated secondary anemia in view of the favorable action of meat and other diet factors. Musser has studied the effect of inorganic iron in a type of anemia representing more closely what is seen in clinical medicine. He found that ferrous carbonate failed to produce any alteration of the experimental hemorrhagic anemias. All of the more recent evidence indicates that the iron is of paramount importance in red blood cell regeneration (Jour. A. M. A., Feb. 18, 1922, p. 512).

Urotropin was removed from the list of articles accepted for New and Non-official Remedies because Schering and Glatz, Inc., refused to place the U. S. Pharmacopeia name hexamethylenamine (hexamethylenamina) on the label and in its advertising so as to make clear to physicians the identity of the product, and because it was sold under therapeutic claims which the Council held unwarranted. An advertising pamphlet sent to physicians in 1921 contains a number of unwarranted statements; particularly objectionable are the claims made for the use of Urotropin as an antiseptic in body fluids that are alkaline, such as the cerebro-spinal fluid, bile, aqueous humor of the eye, saliva, the excretions caused by middle ear infection and other excretions of the nasal, bronchial, laryngeal and mucous membranes. The lack of efficacy of hexamethylenamine in alkaline secretions is generally admitted, and the clinical references to the use of hexamethylenamine in the pamphlet are obsolete. In the introduction to the pam-

phlet, Schering and Glatz state that they are well acquainted with the scientific research work discrediting the efficiency of hexamethylenamine in non-acid media, but that they feel that the accumulated evidence for its efficacy in such conditions should not be "brushed aside." However, the pamphlet is not made up of quotations, but of unqualified statements. With one exception, all reference to the antiseptic properties of the drug in alkaline media are previous to 1913, that is, before the importance of reaction of the medium was fully appreciated. To quote these earlier articles, without regard to the later work which, in most eyes, discredited them, constitutes in effect an exploitation of this brand of hexamethylenamine under unwarranted therapeutic claims (Jour. A. M. A., Feb. 18, 1922, p. 531).

Bio-Chemic Laboratories' Products.—The Bio-Chemic Laboratories, Chicago and Los Angeles, send out the following advertising:

1. "Salvarsan and Mercury without the Needle." In this pamphlet the use of Salv-Absorbs and Merc-Absorbs, preparations for the rectal administration of arsphenamine and mercury, respectively.

2. "Something New in Glandular Therapy—Caplets." This circular declares that "Caplets make possible the preparation of any pluriglandular combinations in your office. * * * Your office girl can make them up for you."

3. "Why Gland Transplantation?" A circular devoted to "Orch-Absorbs" which is said to be "a preparation of interstitial glands for intra-rectal administration." No preparation of the Bio-Chemic Laboratories has been accepted for New and Non-official Remedies. The Council on Pharmacy and Chemistry, however, has published a report on another proprietary form of administering arsphenamine by rectum. This brings out the lack of evidence for the efficacy of this method of arsphenamin administration. The pluriglandular "Caplet" medication is a form of shot-gun therapy that has been the subject of a report of the Council on Pharmacy and Chemistry and has been discussed editorially (Jour. A. M. A., Feb. 25, 1922, p. 603).

PROGRESS

Abstracts to be submitted to Section Supervisors.

MEDICINE

SUPERVISORS:

F. J. HIRSCHBOECK,
FIDELITY BLDG., DULUTH
THOMAS A. PEPPARD,
LA SALLE BLDG., MINNEAPOLIS

AN ANALYSIS OF ONE HUNDRED AND EIGHTY CASES OF CANCER OF THE STOMACH WITH SPECIAL REFERENCE TO THE INCIDENCE OF PRE-EXISTING ULCER: S. Paul Taylor and T. Grier Miller (Am. Jour. Med. Sc., p. 862). The cases were divided into two groups: (1) Those giving a clinical history suggestive of pre-existing ulcer, and (2) those of a progressive downward course without previous symptoms.

A history suggestive of pre-existing ulcer was obtained in only 17 per cent, and the authors conclude that it does not seem probable that the true incidence of such a pre-existing lesion exceeds these figures. Epigastric pain was referred to the back in 29 per cent of the cancers of the pylorus, and of those with reference of pain to the back 80 per cent had pyloric involvement. The apex of the age incidence for the onset of "ulcer" symptoms in the ulcer-before-cancer cases was two decades later than it was in 79 ulcer cases. From this they conclude that ulcers first giving rise to symptoms in middle life are far more liable to become malignant than are ulcers generally, or that the ulcer-before-cancer cases are really malignant from the beginning, and that prompt and radical surgical treatment of all patients first developing symptoms suggestive of ulcer after forty years of age is justified and indicated. Pyloric cancer is associated with definite retention but the free hydrochloric acid and total acidity findings are not abnormally low. Retention does occur in cancer of the lesser curvature. When the cancer was situated elsewhere retention did not occur but the acid findings were distinctly low. A positive diagnosis was made in 96.8 per cent by Roentgen study. At operation the tumors were more extensive and involved the lesser curvature often than the Roentgen ray suggested. Of patients with cancer of the stomach who now come to the surgeon, about one-third are given a chance of cure by radical operation, one-third are treated palliatively, and for one-third nothing can be done.

PAUL A. ROWE.

THE PROGNOSIS OF INVOLUTIONAL MELANCHOLIA—AUGUST HOCH, LATE DIRECTOR PSYCHIATRIC INSTITUTE, NEW YORK STATE HOSPITAL: John R. MacCurdy, New York (Arch. Neur. and Psych., Jan. 1922). "Involutional Melancholia" is probably the most widely known of mental ailments. This condition, until 1907, was recognized as a clinical entity. Dreyfus in 1907 was the first to call attention to the frequent recoveries though many times late and also to the fact that in many of its clinical features there was a resemblance to manic-depressive psychosis.

In this contribution a series of sixty-seven cases are analyzed. The final outcome was determined in all except one case. Age, previous attacks, emotional state and other apprehensive ideas, self accusatory ideas, unreality negativism, hypochondria, erotism, irritability, sexuality, ideas of poverty and sleep are noted for each case in a detailed tabulated form.

Forty-three of these cases are separately classed as benign (recovered) and four as doubtful. In the benign melancholias marked emotional reaction, anxiety with restlessness and delusions of poverty and death were the rule. Their average duration was nine and one-half months. Recovery occurred in from four months to six years after onset. In the malignant melancholias on the other hand hypochondria was prominent; this symptom occurred in but a sixth of the benign cases. Anterotism was present in the majority of cases. Peevishness, diminished interest,

tendency to seclusiveness and surliness were the rule. Ideas of poverty and death were present in this class in the same proportion as in the recovered group. Ridiculous hyperchondriacal ideas usually concerned with the alimentary tract feature in the unrecovered cases.

Presence of symptoms indicating bad prognosis ordinarily may, however, be present for a short period at menopause in the benign forms and not vitiate recovery.

The authors feel that the recovered cases may be regarded as having essentially the same basis as manic-depressive psychoses. Unrecovered should be classed as regressive psychoses, apparently belonging to the dementia precox group. Recovery in the former group usually seemed hastened after discharge from the hospital.

J. C. MICHAEL.

SOME EXPERIENCES WITH THE MELTZER-LYON METHOD OF DRAINING THE BILIARY SYSTEM:

Anthony Bassler, William Henry Luckett, and J. Raymond Lutz. (Amer. Jour. of Med. Sc., Nov., 1921.) The authors have made a comprehensive study of the Meltzer-Lyon method of draining the biliary system and their findings on the whole distinctly controvert those of the original writers. Meltzer's law of contrary innervation was not proved nor accepted by the writers. They doubt any specific action on the part of the magnesium sulphate solution as causing a relaxation of the sphincter of odii and contraction of the gall bladder. They have ascertained that various substances will produce the same effect if subjected to experimentation, hydrochloric acid, of very low potency, yielding the same characteristic bile as magnesium sulphate. The argument is directed chiefly toward the nature of the so called "B" bile of Lyon, the deeper color of which they believe is due to oxidation and not to concentration in the gall bladder. The increase in the specific gravity as noted by Lyon is believed by them to be difficult to evaluate with certainty, on account of the content of magnesium sulphate in the duodenum and in the bile itself, through resorption in the portal circulation and excretion by the liver. They question the dependability of the bacteriologic and cytologic findings in the "B" bile as conclusive of gall bladder infections, as in their opinion they are chiefly due to duodenal and gastric contamination. They believe the most important function of the gall bladder to be to relieve pressure within the biliary system, as a protective measure for the pancreas rather than as a reservoir for bile in digestive way, and think that Meltzer and Lyon deduce too much reasoning from the anatomy and relationship of the gall bladder rather than its function. They have also proved, as have others, notably Dunn of Omaha, that a cholecystectomized individual shows the characteristic "B" bile shortly after operation before the ducts have a chance to dilate. The crux of the argument seems to lie in this latter factor, and seemingly would be most difficult to refute. Lastly, the writers believe that the method is a poor substitute for surgery, and that its field of usefulness is exceedingly limited, probably only at the most as a temporizing means.

F. J. HIRSCHBOECK.

SURGERY

SUPERVISORS:

E. MENDELSSOHN JONES,

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THE SURGICAL TREATMENT OF ACUTE PELVIC INFECTIONS IN WOMEN: F. G. Dubose. (Surg., Gyn. and Ob., Sept., 1921. Page 299-307.) It is estimated that seventy-five per cent of invalidism in women arises from pelvic infection. The author urges earlier and more radical operative treatment in this disease, especially in acute exacerbations and in the primary attack.

Recurrence of pelvic abscess after drainage through the cul-de-sac has been the rule; such procedure draining but one of the many pus pockets in the pelvis.

The author is prompted to do very radical surgery in these cases instead of waiting and adds that however much the cul-de-sac is bulging with pus, the patient is operated upon through a medium lower abdominal incision, so that all the diseased tissue can be examined and treated surgically.

Pus pockets by no means regularly become sterile. Years after the onset of the infection many of these cases develop acute, spreading, or general peritonitis.

The greatest error in the operative treatment of these cases is insufficient surgery and inadequate drainage. The author believes that the morality and morbidity following the non-operative, the expectant plan, and the conservative-surgical is frightful.

The author's plan for the treatment of these cases follows: Immediate operation is done on all cases which present the syndrome of acute surgical pelvis, if first seen within twelve hours after the onset of the infection. If first seen twelve or more hours after onset a varying period of some hours of observation is followed, during which time absolute rest is given the patient, as compatible as possible with the routine and repeated examinations. During this time the most minute and painstaking examinations are made to determine the general condition of the patient. These examinations include blood count, bacterial examination to determine the type of organism one is combating, and any others that may throw light on a remote or complicating disease such as the x-ray and cystoscopic examination. During this time the patient is supported by proctoclysis and hypodermoclysis of saline solutions containing glucose. In the most acute cases, if seen before the eighth day after the onset, the author advises deferring of operation:

1. If the condition is apparently stationary or the symptoms take a more favorable turn during the six or twelve hours consumed in the preliminary study of the case;

2. When the blood examination reveals a high polymorphonuclear count without an accompanying leucocytosis or in the absence of an increasing number of leukocytes;

3. From the third to the seventh day after onset—

when the severity of the peritonitis is at its height and the rest method is being given a chance to have effect—than the operation should be withheld in the absence of an exigency until the more acute general symptoms have subsided.

Do not defer operation:

1. In the presence of a progressive exaggeration of unfavorable symptoms during the period of rest, observation and expectant treatment;

2. If there is sudden relief of pain with a subjective sense of improvement, accompanied by an acceleration in pulse rate and frequently by a lowering temperature, usually indicating thrombosis or rupture of a localized abscess;

3. When there is a sudden fall in a previously high leukocyte count or a decreasing number of leukocytes and an increasing percentage of polymorphonuclears, which indicates a falling resistance;

4. When more than a week has elapsed since the onset of the infection, for the blood during this period of time will have developed, in all probability, a degree of immunity to the limit of its opsonic power;

5. When a mass appears in the pelvis—evidence of the localization of the infectious process by adhesions within a circumscribed area.

The technique of operating on cases of pelvic infection is given by the author, who lays special stress on certain features.

Pelvic débridement is urged, at least the pyogenic membranes with infected tubes, uterus and ovaries should be removed.

Gauze packs are applied over denuded pelvic surfaces to stop oozing and to hinder capillary absorption. Eroded or denuded intestinal surfaces are peritonized or overlaid with omentum. Rubber dam covers the gauze packs and the pelvic operative field, minimizing the formation of adhesions and draining freely and continuously.

In 255 pelvic inflammatory cases operated upon consecutively there was one death. One hundred and sixty-three have been followed up, of which 137 or 84 per cent are cured; 18 or 11.1 per cent are improved; 8 or 4.9 per cent not improved.

Average hospital days 23.3, including one neurotic, who spent 109 days in hospital. Case reports, tables of one hundred and six—three cases whose post-operative course has been followed and an axiomatic review in parallel conclude the article.

FRED R. SANDERSON.

Cysts of the Pancreas. E. S. Judd. (Minnesota Med., Feb. 1921.) Most investigators agree that true cysts of the pancreas originate in the substance of the gland and are due either to intermittent or permanent obstruction to this outflow of pancreatic secretion. Pancreatitis is always associated, but it is difficult to determine whether or not the inflammation is an etiologic factor in the formation of the cyst or is a result of the cyst. Archibald contends that pancreatitis may be the result of bile entering the pancreatic duct, and that the cysts are caused by pancreatitis. Judd failed to find bile in any of forty-

one cysts operated on. The presence of bile would not prove it to be an etiologic factor, unless it could be shown that there was no communication between the cyst and biliary system. Injection of bile into the pancreatic ducts of animals causes pancreatitis, but cysts form in a very small number of these cases.

Cystic tumors of the pancreas rarely become malignant. Hyatid cysts of the pancreas are rare even in countries where they are common in other parts of the body. A few cases have been reported of congenital cystic disease of the pancreas associated with congenital cysts of the kidneys and liver. Hemorrhage into the tissues of the pancreas frequently occurs with the resulting formation of a cyst.

The author reports a series of forty-one cases from the Mayo clinic. In thirty-eight cases operation was performed for the cysts and in three cases the cysts were discovered during operation for some other condition. It was often difficult to locate the cysts with relation to surrounding structures and to determine whether they were true or so-called pseudo-cysts. In only two cases were the tumors malignant or associated with malignancy of the pancreas.

According to Korte trauma is a definite factor in the etiology in about 28 per cent. It was a factor in but one case of the author's series.

The walls of pseudo-cysts which may form in the substance of the pancreas as the result of degeneration, are very thick and composed of fibrous tissue with no epithelial lining. They present higher in the abdomen than do the true cysts, and are not so closely attached to the pancreas; tissues are usually so densely matted that it is difficult to establish the relation to approximating structures. According to Opie the formation and enlargement of pseudo-cysts are due to the irritating products of the pancreas. This formation has also been ascribed to a collection of fluid in the lesser peritoneal cavity. The fluid contains epithelial cells, fat, sometimes bile, crystals, blood cells, and necrotic tissue. One or more of the pancreatic enzymes is usually present.

Pancreatic cysts usually occur in persons of middle age although several cases have been reported in children of a few months, and in persons more than 70. In the Mayo Clinic series, there were twenty-four females and seventeen males, the usual preponderance of females. The tumor presents as a rounded or oval semi-fluctuating mass at the umbilicus, in the midline above it, or just to the left of the midline. The size varies greatly. The cyst is usually fixed, although when it arises near the tail of the pancreas, it may be movable. A pancreatic cyst rarely presents on the right side of the midline. As it enlarges it extends forward, coming in contact with the anterior abdominal wall, often crowding the stomach upward and the colon downward; it may present between the two behind the meso-colon or between the layers of the transverse meso-colon.

The symptoms are due to pressure on adjoining organs. Pain is nearly always present. Large tumors press on the stomach causing indigestion and vomiting; loss of weight is often considerable; and jaundice is usually absent. Glycosuria and diabetes apparently follow severe chronic pancreatitis. Osler collected 134 cases; only nine of the patients had associated diabetes. In Judd's forty-one cases the time of onset of symptoms varied from three

weeks to twenty-five years. The frequency of associated gall-bladder disease was a striking feature. Two patients had diabetes at the time of operation for the cyst, both died in about one year in diabetic coma. One other patient developed diabetes after the operation and four patients had sugar in the urine.

The ideal form of treatment is complete enucleation from the pancreas and surrounding structures but because of its intimate attachment, this is often not feasible. Bleeding is always pronounced and diabetes may result, if too much of the pancreas is removed. It is often advisable to drain the fluid after the wall of the cyst has been sutured to the parietal peritoneum, or after packing with gauze to protect surrounding structures. Drainage is usually prolonged and may be very irritating to surrounding tissues. It continues until the mucous membrane lining has been completely destroyed. In some instances, the cysts are multiple and two or more operations are required. Whenever it is possible, it is advisable to strip out any mucous membrane lining that can be removed without danger of hemorrhage. The more radical procedures seem to shorten convalescence. In this series patients in whom drainage was instituted seem to recover as completely as those from whom cysts were removed. Most of the wounds drain for several weeks, some for months, and a few have been reported to have drained for years. In the forty-one cases there were no deaths from the operation.

V. C. HUNT.

GYNECOLOGY AND OBSTETRICS

SUPERVISORS:

ARCHIBALD L. McDONALD,

FIDELITY BLDG., DULUTH

ALBERT G. SCHULZE,

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THE SIGNIFICANCE OF THE PELVIC OUTLET IN PERINEAL LACERATIONS, CYSTOCELE AND PROLAPSE: Arthur Morse. (*Amer. Jour. Ob. and Gyn.*, Vol. 2, No. 2.) The author goes over the records of 100 cases that presented themselves at the Woman's Clinic at Yale for operative relief of perineal lacerations, cystocele or prolapse.

His object is to determine if there is any connection between the size of the pelvic outlet, method of delivery and the damage sustained, if any.

Of these one hundred pelvises, 79, or 80 per cent, would be regarded as normal. Of this number, 60, or about 75 per cent had a cystocele or prolapse of which 40 per cent had been forceps deliveries. Of the remaining 19, or 25 per cent, there were perineal lacerations without the other injuries and of these 21 per cent were forceps deliveries.

Twenty-one of the 100 were funnel shaped and of these one-third had injury to the anterior pelvic segment and two-thirds had perineal damage calling for a repair.

The explanation is this: A normal sized outlet allows the occiput to be delivered close under the pubic arch thus saving the perineum but at the expense of the soft structures in the anterior segment. A funnel pelvis forces

the head posteriorly at the expense of the perineal structures but without damage to the anterior segment. In a forceps delivery our desire seems to be to save the perineal structures without commensurate regard for those at the anterior segment.

This is worthy of gynecologic consideration for he states that mensuration of the pelvic outlet should be employed in the pre-operative examination of women still in the child-bearing period who present themselves for a secondary repair of perineum and the type of plastic procedure should be adopted to the type of outlet in the particular case.

ALBERT G. SCHULZE.

NAUSEA AND VOMITING IN PREGNANCY: Victor John Harding. (London Lancet, Aug. 13, 1921.) This is the writer's second paper on this subject, the first one appearing about two years ago, written jointly with J. W. Duncan.

The primary etiological factor in this condition is first the state of pregnancy itself and imposed on this a period of starvation of longer or shorter duration resulting in a deficiency of glycogen in the liver, followed inevitably by a fatty infiltration.

There is a minor periodicity determined by the fasting hours of the day. The longest period being the night has given rise to "morning sickness."

There is also a major periodicity covered by the first trimester of pregnancy and the writer explains it by the parasitic life of the fertilized ovum and the formation of the placenta both of which are accompanied by a period of nitrogen loss. This is termed "physiologic vomiting of pregnancy."

Formation of the placenta offers the greatest maternal glycogen drain as it functions as a glycogen storer for the fetus. With placenta formation complete, a glycogen equilibrium is established, the fatty infiltration disappears and with it the vomiting.

Those cases that fail to cease vomiting at the fourth month are explained as being due to failure on the part of the placenta and maternal liver to reach a glycogen equilibrium. As secondary etiological factors, not as complications, the writer mentions intestinal intoxication and neurosis.

Treatment consists of a high carbohydrate diet taken in small amounts and at short intervals. Fluids to overcome the dehydration. If vomiting defeats oral feeding, rectal feeding in the form of 6 to 8 ounces of a 5 or 10 per cent glucose solution is resorted to. Bromides are useful.

Intestinal putrefaction and neurosis must not be overlooked.

In the mind of the writer the pernicious type is explained by the above glycogen deficiency and supported by the work of Underhill and Rand.

ALBERT G. SCHULZE.

CONTRIBUTION TO THE STUDY OF THE RELATION OF SYPHILIS AND HYPERTROPHY OF THE OMENTUM: Edmond Levy-Solal. (Gyn. et Obstetrique

Tome IV, No. 2.) This article reviews the French work on the subject beginning with that of Pinard in 1891, who first affirmed the hypertrophic influence of syphilis on the placenta. This investigator gave the ratio of the weight of the syphilitic placenta to that of the fetus as 1 to 4. This work has not been universally accepted and there are many apparent exceptions, associated with recent infections, hereditary and latent forms, influence of treatment, and variations at different stages of pregnancy. There are many factors in the problem and some consider a ratio of from $\frac{1}{3}$ to $\frac{1}{4}$ of the fetal weight as physiological and not specific.

The conclusions of this article are based on work done in the Baudoloue Obstetrical clinic and the associated syphilitic dispensary. The results are presented from two standpoints: 1st, hypertrophy of the placenta in relation to syphilis; 2nd, undoubted syphilis in relation to hypertrophy of the placenta. Of 176 cases of definite hypertrophy of the placenta, 99 or 56 per cent were from patients who showed undoubted evidence of syphilis, 41 were suspicious and 28, were definitely excluded.

There were 97 cases of pre-existing syphilis in which the diagnosis was made by the history or the Wassermann. Fifty-seven of these showed marked placental hypertrophy, while 40 showed a placenta within normal relations. Pre-existing syphilis, untreated, causes placental hypertrophy in the majority of cases. Active treatment with arsenic limits this influence. Florid syphilis is associated with placental hypertrophy unless actively treated early during pregnancy. Syphilis contracted during pregnancy causes such hypertrophy, in about one-fourth of the cases and the effect is most marked in those contracted early, and untreated.

Active treatment during pregnancy tends to prevent hypertrophy of the placenta.

ARCHIBALD L. McDONALD.

BACTERIOLOGY AND PATHOLOGY OF FALLOPIAN TUBES REMOVED AT OPERATION: Curtis. (Surg., Gyn. and Ob. Vol. 33, No. 6.) This report is based on a clinical, bacteriological and pathological study of 300 patients, and 192 specimens. In previous papers, the author has brought out the fact that the primary lesion was in the cervix, that dilation and curettage often caused extension, and that the ordinary Stundorff amputation did not always remove the entire infected area.

Gonorrhoeal infection was diagnosed definitely in 70 per cent of the cases and 10 per cent more were probably due to this infection. Positive cultures were developed from 19 of 64 cases which presented gross inflammatory lesions, but only in those which had showed fever or leucocytosis within two weeks. He assumes that the tube does not remain as an active focus of the disease, and that recurrent attacks represent reinfections from other foci; i. e., cervix.

Gross pathology: The adhesions are usually comparatively easily broken down. The ampulla of the tube is swollen and congested, the fimbria closed by fusion or adhesions. Massive induration is usually the result of repeated attacks.

Microscopically: The blood vessels are enlarged, occasionally with hemorrhage into the tube, the epithelium is swollen and destroyed with fusion of the villous folds, there may be buried masses of gland epithelium, the stoma contains blood cells; polymorphonuclears, lymphocytes, and particularly plasma cells. The persistent characteristic findings are increased blood vessels, and fusion of the villi.

Non-venereal tubal infection involves surrounding structures: dense peritoneal adhesions, perisalpingitis, with marked infiltration of the muscle and submucous coats. The fimbriated ends are more often patulous. Inflammatory reaction in the mucosa is less prominent, and less adhesions exist between the villus folds.

Tuberculosis of the tubes was present in 5 per cent of all cases where general abdominal tubercular peritonitis was excluded. Less than half could be diagnosed without microscopic study. Dense adhesions indicate repeated attacks. The walls are indurated, fimbria adherent, and the lumen distended with caseous contents.

The mucosa is hyperplastic with adhesions between the villi, and destruction of epithelium. There is infiltration with round cells, tubercle formation with giant cells.

ARCHIBALD L. McDONALD.

PEDIATRICS

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COMMON NERVOUS CONDITIONS OF CHILDREN:
R. S. Miles. (*Arch. of Ped.*, Oct., 1921.) By the common nervous conditions of children, the author refers to the type of patient seen from day to day, presenting no definite pathologic lesion as far as one can discern, but a child who reacts abnormally to any form of stimuli, and whose reaction is out of proportion to the existing cause.

Realizing that neuroses causes more suffering among the human race than any other ailment, and that perfectly balanced, emotionally stable adults are no longer the rule, the necessity for the early recognition and proper appreciation of the importance of the nervous state of the infant or young child can not be emphasized too much.

It is true that the inhibiting function of the brain is not at its maximum in infancy, while the irritability of the peripheral nerves reaches a high grade of development early in life. As a result, we have an unbalanced condition for a considerable period of time, which is, no doubt, responsible for many of the peculiar nervous manifestations seen during the period of infancy and even up to the third year of life.

The nervous child, as we observe, presents, as a rule, one of two types of what we call temperament, or disposition. It is characterized either by hypersensitive and exaggerated responses to any form of stimuli, either physical or mental, as shown by the increased tendon reflexes, convulsions, tics, etc., or by the opposite manner of reacting, being depressed, melancholy and extremely re-

served. These types are not so clearly defined during the period of infancy as they are in later childhood. With the infant, we meet disturbances of digestion, fretfulness, convulsions, delayed dentitions, vomiting, and restlessness. As the infant passes on to childhood we observe symptoms no less pronounced, but of a different nature; namely, disturbed sleep, night terrors, enuresis, perversities of appetite, restlessness, etc. Unless these are corrected we have them intensified as he advances into puberty and adolescence, at which time they assume more definite organization in the various forms of neuroses.

Nervous disorders of older children rarely appear suddenly. They are the end results of many contributing factors which have their origin prenatally or postnatally. Important among the causes of the nervous conditions of the child is to some extent his inherited lack of mental stability, but much greater is the influence of his environment. It is hard to make the parents realize this. Fatigue no doubt ranks more closely to inheritance as a cause for nervousness than any of the rest of this group. It is brought about by too close confinement as well as too great indulgence in activity. In the poorly regulated homes, there is little or no attention paid to sleeping or resting hours.

When the child arrives at the school age, he faces new problems which bring about conditions peculiar to that age, and these conditions bear heavily upon him. He readily tires of the schoolroom routine, and improves quickly when allowed the freedom of out-door life. These children are very emotional and become easily terrified, their power of imagination is very great, and they are inclined to fret a great deal.

As the child approaches maturity and his brain cells become more stabilized, then is the proper time to allow a heavier load applied gradually. If these stages of development are disregarded, as they are in many of our modern school and home methods, we create an aversion in the mind of the child toward his studies, and he is a failure for this reason. The author states that nutrition of the proper kind is one of the first requirements in restoring and maintaining a healthy nervous balance. Second, long hours of rest are necessary to allow for repair and the storing up of energy. These two features alone, if properly applied, will in most instances meet the requirements of the nervous child.

The physician must be the monitor in the home, otherwise it is futile to attempt to secure satisfactory results.

No part of the child's physical makeup should be overlooked in the treatment of the nervous disorder. His life should be regulated so that he develops symmetrically: his muscle and bone tissue need as much attention as does his brain tissue. He should be allowed to live as near to nature as possible.

R. N. ANDREWS.

THE ABDOMINAL PAIN OF THROAT INFECTIONS:

Joseph Brennemann. (*Amer. Jour. of Dis. of Child.*, Nov., 1921.) The paper directs attention to the symptom that is of very frequent occurrence and which has so far as the author knows, received little if any attention in the literature. The symptom referred to is that of abdominal pain

occurring often to the exclusion of all other subjective symptoms, in the course of throat infections in children. By throat infections, is meant the whole series of upper respiratory tract infections from the common cold to a fatal septicemia. Many patients will complain of abdominal pain at the beginning or after the acute manifestations in the throat; often they complain of nothing else, for it is a well known fact that children only exceptionally complain of the throat itself. The nature and the location of the pain are fairly constant and the time of occurrence vary much in the different individuals. Sometimes it apparently lasts for weeks and even months after all other symptoms have disappeared. It may be more or less constant or intermittent. The abdomen is only exceptionally distended and tenderness is often absent and nearly always less marked than unelicited pain. The child will usually point to the region of the umbilicus when asked to indicate where the pain is.

As to the cause of this pain, one can only conjecture. In children of three or four years, I believe the abdominal pain is often due to nausea. The author is convinced that in the causation of these abdominal pains of throat infections, indigestion, myalgia, grippy aching, neuritis, or any other referred pain from the thorax, or from the vertebrae column carried along the intercostal nerves, play no part. In the pain that usually occurs during such an infection, that lasts for some time, and even outlasts the other evidences of the original infection, the author believes that the cause will be found in the mesenteric and retroperitoneal glands.

In a recent paper on abdominal pain in children, Hutchinson emphasizes the importance of enlarged glands in the causation of abdominal pain in children, but he does not relate them to throat infections. The pathogenesis of such enlarged glands is again a matter of speculation. Two routes of infection are possible; by the blood stream and by direct transmission. The latter is most plausible. We are dealing with organism that invade the mucous membrane of the throat, and other adjacent mucous membranes and it is at least possible that they have a similar action on the intestinal mucous membrane. They are undoubtedly swallowed in enormous numbers, and it is by no means proven that they cannot pass the stomach without losing their virulence.

The true cause of the pain may be, a localized enteritis or colitis. That the glands might become involved secondarily, even to the point of abscess formation, or might be enlarged for a time after the intestinal lesion is healed, is quite probable. While our interests in the pathogenesis of this pain may be purely speculative, it is of practical value from a diagnostic standpoint to know that there is such a pain, and be familiar with its clinical setting. Throat infections may cause abdominal pain resembling appendicitis and this, especially, requires a very careful differentiation. We know that pain in the right lower quadrant in children is very often not appendicitis, and when this pain is accompanied with the throat infection and not accompanied with much tenderness or rigidity, we are often justified in ruling out appendicitis but we must remember that appendicitis does occur in children and if such, it has to be recognized and promptly taken care of.

R. N. ANDREWS.

STUDIES OF INFANT FEEDING: Alfred Bosworth. (Amer. Jour. of Dis. of Child., Dec., 1921.) It is quite generally held that the presence of hard protein curds in the stools from bottle fed infants is indicative of a faulty digestion of the casein fed in the modified cow's milk formulas. Such a view seems to confuse the issue, placing on the baby a fault which should be borne by the person under whose direction the modified milk formulas are prepared. Brennemann has clearly demonstrated this in four cases in which he was able to produce curds in infants' stools and make them disappear at will by manipulation of the food. The chemical composition of these hard curds leads the author to believe that they are not produced as the result of any fault in the digestive functioning of the infant but that they are produced by a normal digestion, functioning on an unnatural food which is only partly modified to a condition adaptable to the requirements of the infant. Cow's milk contains inorganic constituents in sufficient amounts to supply the demands of the rapid growth of the calf and is especially rich in calcium and phosphoric acid, which the calf needs in considerable quantity, but the infant uses very sparingly. When fed to infants in the proportions found in cow's milk, these substances are greatly in excess of the amounts required to supply the demands of the infant, and hence are eliminated either in the urine or the feces.

The insoluble calcium phosphate is inert in so far as its food value to the infant is concerned for it passes through the alimentary canal undigested and unabsorbed and appears in the feces. Its presence in milk, however, is a dangerous factor which must receive proper consideration, for, by the development of acidity within the milk, the calcium combined within the phosphate in an insoluble form is converted into soluble calcium. This soluble calcium, in addition to that naturally present in the milk, together with the developed acidity, have marked influence on the nature of the casein or paracasein curds formed by the action of the gastric juices.

The other two forms of calcium, that combined with the casein and that present as soluble salts in the whey, are responsible for the loss of fat in the form of calcium soaps in the stools, and the author states that they play an important part in causing the protein curds which are found in the stools from some bottle fed infants.

The calcium and casein in cow's milk are the factors involved in the curdling of this milk by the action of rennin. An increase in either the calcium content or the acidity of milk tends to toughen the curds produced by the action of rennin. The calf can digest these curds but the infant fails to completely digest it. The inability of the infant to digest these curds does not indicate an impaired digestive functioning but does indicate a faulty supervision in the feeding of the infant. A control of the curdling milk may be obtained by the addition of lime water. The addition of lime water to milk makes it less acid and results in a decrease in the amount of soluble calcium due to the precipitation of insoluble calcium phosphate. If sufficient lime water is added the soluble calcium can be reduced to such a small amount that the milk will not curdle upon the addition of rennin. The nature of the curd formed by the action of rennin on milk may also be influenced by boiling the milk and by the action produced by the addition of such substances as malt soup,

dextrimaltose No. 3, barley gruel, and Mellen's Food because they contain potassium salts, and also have a certain physical action. The rate of digestion of the curds formed from milk depends upon the surface exposed. The large tough curds produced from cow's milk, will be slowly and incompletely digested in the intestines leaving a residue to be excreted in the feces while the fine soft curds produced from breast milk will be rapidly and completely digested. We know that the removal of the soluble calcium from cow's milk prevents its curdling by the addition of rennin. If calcium is responsible for the curds formed from cow's milk and if the protein curds which appear in the stool are the same curds, undigested, we should expect to find some relation between the calcium and casein intake and the nitrogen eliminated in the stools. Such a relation has been found to exist. These protein curds are composed of protein, fat and dicalcium phosphate, while the protein in the curds is calcium paracasein.

R. N. ANDREWS.

TREATMENT OF PYLORIC STENOSIS: H. Erberg, and B. Hamilton, Stockholm, Sweden. (*Arch. of Ped.*, Dec. 1921.) The author reviews fifty-seven cases and lays down the following principles of treatment:

1. The organism must be supplied with water in sufficient amount.
2. The infants must be nourished with breast milk and
3. Isolated.

The water must be supplied to prevent too high a degree of desiccation. This is a very important part of the treatment. The best way is subcutaneously, and from 100-150 c.c. sometimes twice daily. This may be kept up for several weeks. It is recognized that in any pyloric stenosis there is a tendency to spontaneous recovery. The most dangerous result of the stenosis is probably the desiccation of the organism. Consequently this effect of the stenosis must be counteracted as far as possible in order to save the life of the infant until spontaneous recovery begins. The records show that in those cases which received treatment early the recovery was one or two weeks shorter.

A factor of the greatest importance is the food. The infants are mainly nourished with breast milk, often however one or two meals of buttermilk are given in addition. It has been found that the combination makes the gain in weight more rapid. Usually six meals are given daily and in some instances smaller and more numerous meals are preferable. These babies are best isolated so as to protect them from external infection of any sort.

In a few cases stomach washings seem to have had some effect, but in the majority, where they have been tried, they have not at all influenced the course of the disease. The same may be said of drugs; atropine, cocaine and others. The mortality in pyloric stenosis at this hospital is over 3 per cent lower than in previous reports of non-operative cases. The surgical treatment may shorten the duration of the disease but it has the disadvantage that good results seem to be obtained only by specially trained operators. In localities, where the necessary skill is impossible to acquire, because of the scarceness of cases, medical therapy must be employed and may, as seen, in

respect to the prognosis of the disease, be equal to surgical treatment.

R. N. ANDREWS.

THE IMMUNIZING VALUE OF TOXIN-ANTITOXIN

D. J. PARADINE, M. D.

Duluth, Minn.

Some Observations on the Schick Test:

This study was begun fifteen months ago at St. James' Orphanage, Duluth, Minn. Every child in the institution (one hundred and sixty-six) was given the Schick test.

These children ranged in age from two to sixteen years. A large majority of them were under twelve. We found that forty per cent of those under ten years reacted positively; sixty per cent of the children under the age of five reacted positively. In the whole institution, we found that out of the hundred and sixty-six so tested one hundred and four gave a positive reaction. To those who reacted positively we gave the usual course of three injections of toxin-antitoxin, injecting 1 c.c., and repeating this dose every sixth day until we had given three successive injections.

The children were first tested in September, 1920. In the month of January of the following year, we had an outbreak of diphtheria at the institution. No child who had received toxin-antitoxin injections contracted diphtheria. Of the sixty-two who reacted negatively to the Schick test, three contracted diphtheria, while in ten others the presence of the disease was probable, although the bacteriological diagnosis was doubtful.

After the quarantine had been lifted we again tested the children. Those who had reacted positively to the original test and had received the three injections of toxin-antitoxin were found to react negatively. As a further precaution we administered toxin-antitoxin to every child in the institution.

During July, 1921, we again applied the Schick test to all the children. We found that those who reacted positively to the first test given in September, 1920, and whose reaction became negative after the administration of toxin-antitoxin, continued to react negatively at this time, nine months later.

We have had no diphtheria since the outbreak in January, 1921.

Because of these findings we have decided to administer toxin-antitoxin, as a routine procedure, to all children entering the institution, regardless of their reaction to the Schick test, for we believe this test to be no criterion of susceptibility or non-susceptibility to diphtheria in institutional work.

Numerous inquiries have reached us regarding the after-effects of the injection of toxin-antitoxin. Aside from a slight soreness and swelling at the site of injection, no ill effects were noted. From our experience it would seem that the younger the recipient the less the subsequent inconveniences.

It is our intention to record further observations on the effects of toxin-antitoxin in a later report during the current year.

In this work I have been ably assisted by the interns of St. Mary's Hospital, to whom I wish to express my thanks.

D. J. PARADINE, M. D.

MINNESOTA STATE BOARD OF MEDICAL EXAMINERS

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BY EXAMINATION

NAME	SCHOOL OF GRADUATION	RESIDENCE
Adams, Robert Warren.....	U. of Minn., M. B., 1921.....	General Hospital, Minneapolis
Bregel, Fred L.....	U. of Minn., M. D., 1918.....	629 Washington Ave. S. E., Minneapolis
Chang, Pu Yung.....	Harvard, China, M. D., 1917.....	Hopewell Hospital, Minneapolis, Minn.
Christie, Robert L.....	U. of Minn., M. D., 1917.....	Long Prairie, Minn.
Crompton, Chas. R. B.....	U. of Toronto, M. B., 1915.....	Mayo Clinic, Rochester, Minn.
Daniel, Lewis M.....	U. of Minn., M. B., 1921.....	914 Lowry Bldg., St. Paul, Minn.
Dvorak, Benj. A.....	U. of Minn., M. B., 1921.....	University Hospital, Minneapolis
Dahlin, Ivor Theo.....	U. of Minn., M. B., 1921.....	4032 Park Ave. S., Minneapolis, Minn.
Farnham, Russell Milton.....	U. of Minn., M. B., 1921.....	2416 Fremont Ave. S., Minneapolis, Minn.
Ford, Burton Calvin.....	U. of Minn., M. B., 1921.....	St. Mary's Hospital, Minneapolis, Minn.
Green, Robert Gladding.....	U. of Minn., M. B., 1921.....	University of Minnesota, Minneapolis, Minn.
Hastings, DeForest R.....	U. of Minn., M. B., 1921.....	421 Walnut St. S. E., Minneapolis, Minn.
Jernstrom, Roy E.....	U. of Minn., M. B., 1921.....	1800 3rd Ave. S., Minneapolis, Minn.
Kucera, Frank Jos.....	U. of Minn., M. B., 1921.....	Hopkins, Minn.
Larson, Leonard Winfield.....	U. of Minn., M. B., 1921.....	329 Union St., Minneapolis, Minn.
Leopard, Brand A.....	U. of Minn., M. B., 1921.....	Melrose, Minn.
Lowe, Earl Raymond.....	U. of Minn., M. B., 1921.....	Northern Pacific Hospital, St. Paul, Minn.
Lund, Harold O.....	U. of Minn., M. B., 1921.....	St. Mary's Hospital, Minneapolis, Minn.
Maeder, LeRoy M. A.....	U. of Minn., M. B., 1921.....	512 S. E. Delaware St., Minneapolis, Minn.
Morris, Ralph Edwin.....	U. of Colorado, M. D., 1902.....	244 Nelson Ave., St. Paul, Minn.
Meyer, Paul F.....	U. of Minn., M. B., 1921.....	Belle Plaine, Minn.
Murdy, Robert Colliver.....	U. of Minn., M. B., 1921.....	1021 S. Washington St., Aberdeen, S. D.
McMurtrie, Wm. Burns.....	U. of Minn., M. B., 1921.....	Proctor, Minn.
McInerney, Maurice W.....	U. of Minn., M. B., 1921.....	St. Mary's Hospital, Minneapolis, Minn.
Owens, Percy Laing.....	U. of Minn., M. B., 1921.....	General Hospital, Minneapolis, Minn.
Oppegaard, Chester L.....	U. of Minn., M. B., 1921.....	University Hospital, Minneapolis, Minn.
Plankers, Arthur G.....	U. of Minn., M. D., 1918.....	858 Cherokee Ave., St. Paul, Minn.
Richardson, Geo. Edward.....	U. of Minn., M. B., 1921.....	510 Essex St. S. E., Minneapolis
Radtke, Herman P.....	U. of Minn., M. B., 1921.....	429 Union St. S. E., Minneapolis, Minn.
Spurzem, Raymond Jacob.....	U. of Minn., M. B., 1921.....	University Hospital, Minneapolis, Minn.
Shepard, Wm. P.....	U. of Minn., M. B., 1921.....	512 Delaware St. S. E., Minneapolis, Minn.
Stewart, Louis Arthur S.....	McGill, M. D., 1916.....	Rochester, Minn.
Spain, Roderick Jos.....	National U., Dublin, Ireland, M. D., 1918.....	Duluth, Minn.
Thordardson, Solveig S.....	U. of Minn., M. B., 1921.....	2202 Blake St., St. Paul, Minn.
Tanquist, Edwin John.....	U. of Minn., M. B., 1921.....	Swedish Hospital, Minneapolis, Minn.
Urberg, Sofus E.....	U. of Minn., M. B., 1921.....	329 Union St. S. E., Minneapolis, Minn.
Wangenstein, Owen H.....	U. of Minn., M. B., 1921.....	429 Union St. S. E., Minneapolis, Minn.
Wolfe, Howard H.....	U. of Minn., M. B., 1921.....	1799 Lincoln Ave., St. Paul, Minn.
Waldschmidt, Reuben H.....	U. of Minn., M. B., 1921.....	509 E. River Road, Minneapolis, Minn.
Zeckwer, Isolde Therese.....	Woman's Med. Col. Pa., 1919, M. D.....	Rochester, Minn.

THROUGH RECIPROCITY

Ahrens, Edward G.....	Bennett, 1911, M. D.....	Bellingham, Minn.
Anderson, Walter Thos.....	Johns Hopkins, M. D., 1917.....	1038 Lowry Bldg., St. Paul, Minn.
Asbury, Eslie.....	U. of Cincinnati, M. D., 1920.....	Rochester, Minn.
Bowing, Irwin Ellis.....	Rush, M. D., 1921.....	1138 N. Leavitt St., Chicago, Ill.
Burns, John Gillett.....	Johns Hopkins, M. D., 1920.....	Rochester, Minn.
Carman, Russell Daniel.....	Marion Sims, M. D., 1901.....	Rochester, Minn.
Crawford, Albert S.....	Cornell, M. D., 1915.....	Rochester, Minn.
Davis, Kenneth S.....	U. of Nebraska, M. D., 1918.....	Rochester, Minn.
Freed, Cecil Forest.....	U. of Pa., M. D., 1920.....	Parkersburg, West Virginia
Goehring, Carl.....	U. of Mich., M. D., 1915.....	Rochester, Minn.

Herbst, Wm. Parker, Jr.....	Georgetown, M. D., 1915.....	Rochester, Minn.
Jameson, Carol E.....	Stanford U., M. D., 1921.....	Rochester, Minn.
Kent, Geo. Benjamin.....	Indiana Univ., M. D., 1916.....	Rochester, Minn.
Klaveness, Eivind.....	U. of Christiania, M. D., 1897.....	625 Palace Building, Minneapolis, Minn.
Larson, Ernest Eric.....	Rush, M. D., 1920.....	Rochester, Minn.
Lyons, John Hugh.....	Geo. Wash. Univ., M. D., 1918.....	Rochester, Minn.
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NATIONAL BOARD CREDENTIALS

Barrier, Chas W., Jr.....	Tulane, M. D., 1917.....	Rochester, Minn.
Finney, Wm. Parker, Jr.....	Johns Hopkins, M. D., 1916.....	Rochester, Minn.
Heacock, Chas. Hunter.....	U. of Pa., M. D., 1917.....	Rochester, Minn.

BOOK REVIEWS

BOOKS RECEIVED FOR REVIEW

GLANDS REGULATING PERSONALITY. Berman. Macmillan Co.	RADIANT ENERGY AND OPHTHALMIC LENS. Booth. P. Blakiston's Son & Co. \$2.25.
COMPEND OF PHYSIOLOGY. Brubaker. P. Blakiston's Son & Co. \$2.00.	FOOD PRODUCTS, THEIR SOURCE, CHEMISTRY AND USE. 2nd Edition. Bailey. P. Blakiston's Son & Co. \$2.50.
OPERATIVE SURGERY. Horsley. C. V. Mosby Co. \$10.00.	SCIENCE OF OURSELVES. Fuller. Oxford University Press.
PROSTHETIC DENTISTRY. Gabell. Oxford University Press. \$4.25.	FUNDAMENTALS OF BACTERIOLOGY. Morrey. Lea & Febiger. \$3.25.
MENTAL HOSPITAL MANUAL. MacArthur. Oxford University Press. \$5.25.	NUTRITION AND CLINICAL DIETETICS. Carter. \$7.50.
STUDIES IN DEFICIENCY DISEASE. McCarrison. Oxford University Press. \$10.00.	EVOLUTION OF DISEASE. Danyez. Lea & Febiger. \$2.50.
EPISCOPAL HOSPITAL REPORTS. Vol. V. 1917-1920.	ASSESSMENT OF PHYSICAL FITNESS. Dreyer. Paul B. Hoeber. \$3.50.
HUMAN ANATOMY. 6th Edition. Jackson. P. Blakiston's Son & Co. \$10.00.	DISEASES OF THE SKIN. Ormsby. Lea & Febiger. \$10.00.
DISEASES OF THE SKIN. 4th Edition. Sutton. C. V. Mosby & Co. \$9.50.	CREATIVE CHEMISTRY. Slosson. The Century Co. \$3.00.
GENERAL PATHOLOGY. Oertel. Paul B. Hoeber. \$5.00.	LIFE OF JACOB HENLE. Robinson.
	EPIDEMIOLOGY AND PUBLIC HEALTH. Vaughn. C. V. Mosby Co. \$9.00.
	OPERATIVE SURGERY. 6th Edition. McGrath. F. A. Davis Co. \$8.00.

TUBERCULOSIS AND HOW TO COMBAT IT. F. M. Pottenger. C. V. Mosby Co. \$2.00.

This is a book for tuberculous patients and aims at educating them not only as to their own particular ailment and its treatment but also in regard to prevention.

As the author explains, it is a compilation of talks given to his patients and is not intended to take the place of a physician.

There is a minimum of things technical in the book which makes it easily read and understandable by the laity.

EVERETT K. GEER, M. D.

STARVATION (ALLEN) TREATMENT OF DIABETES.

L. W. Hill & R. S. Eckman. W. M. Leonard, Publisher.

This is the fourth edition of a small but important book. Its purpose is not so much to instruct the patient regarding the theory of the disease as it is to keep him in the straight path of suitable diet.

There are numerous diets given preceded by a short explanation of the details of treatment.

EVERETT K. GEER, M. D.

REFRACTION AND MOTILITY OF THE EYE. Alger. Second revised edition. F. A. Davis Company, Philadelphia, 1920.

The first edition of this work was published in 1910. The new edition, following much the plan of the first, appears in eighteen chapters, contains 367 pages, and is accompanied by 125 illustrations. The author follows the usual plan adopted for works of this scope, taking up in order, and very briefly, physiological optics, anatomy, methods of examination, errors of refraction, and those of motility. There are included, also, chapters on color blindness, fields of vision, relation of functional eye disease to general medicine and ocular malingering. Treatment of these subjects is necessarily elementary and the work is, therefore, best adapted to the needs of medical

students and those beginning the study of the specialty.

CHARLES E. CONNOR.

GRAPHIC METHODS IN HEART DISEASE. By John Hay, M. D., F. R. C. P. With an Introduction by Sir James Mackenzie, M. D., F. R. C. P.

This book is an Oxford Medical Publication, second edition, 1921. It consists of 178 pages of really worthwhile reading. Its 176 illustrations, which for the most part are those of typical polygraphic and electrocardiographic records, are very well chosen and, indeed, clinch the important facts brought out in the text.

The introduction by Sir James Mackenzie is a timely plea for the more widespread use of instrumental methods in cardiovascular disease in clinical medicine. As he says,—"In clinical medicine, the recognition of symptoms depends to a very great extent upon the senses of the observer. * * * To supplement the inadequate power of perception, the imagination is often called upon, with the result that statements are made which are supposed to be a true description of facts, but which are in reality a combination of imperfect observation and possible erroneous deduction. * * * The result is that many features of the circulation are misunderstood, while many others have not been recognized. * * * When care is taken to avoid errors due to defective apparatus, the tracing of any movement of the circulation obtained by instrumental means remains as a true and permanent record of an actual event. The interpretation of tracings should be kept distinct in our minds from the actual record itself. The latter is a true representation; the former represents the present phase of our knowledge, which may or may not be correct. * * * The employment of these methods of investigation is giving not only a stimulus to further inquiry, but is acting as a guide in directing the inquiry towards a definite aim in the fields of physiology, pathology and pharmacology, as well as in clinical medicine. * * * A further benefit is derived from the employment of graphic methods in that it compels the clinician to think clearly, to reason with precision, and to observe with accuracy."

The book was so absorbing, contained so many interesting facts and explanations and was all-in-all so worth while, that the reviewer read it with increasing enjoyment four times. He still feels that he could read it again with profit.

The author, in his introduction, calls attention to the chief points of advance in graphic methods, and the rela-

tion of these methods to the advance in our clinical knowledge of cardiovascular diseases in the eleven years since the publication of his first book. The aim of the author is to make intelligible the graphic records so widespread in the literature today. In this purpose he has certainly succeeded, especially as far as the polygraphic section is concerned, which is unusually complete. The electrocardiographic section, which was purposely brief, is too much so to be of any great value. The illustrations in this section are very good as far as they go.

The polygraphic section opens with a definition of the common terms; this is followed by a presentation of the myogenic theory and some necessary anatomical considerations. The author then describes the various types of instruments available and the relative merits and disadvantages of each. There is a little too much time spent here in the description of the older and less used types of instruments. In the twenty-five pages that follow there is a careful and timely consideration of normal records, generously illustrated. Then in the following order he takes up in detail the auricular type of venous pulse; extrasystoles, with a careful description of each type; the ventricular type of venous pulse, its diagnosis, treatment and prognosis; and disturbances of function (conductivity, excitability, contractility, sinus production, sinus arrhythmia, paroxysmal tachycardia, auricular flutter, and tonic-ity). He then inserts a short chapter on difficulties in interpretation of sphygmograms, and also a short one on an illustrative case of mitral stenosis.

Throughout the polygraphic section the definitions and interpretations are very good, and the accompanying illustrations nicely show the important points. The author has failed in one important detail, however, and that is he has neglected to present a system for the examination of the records, which, to the beginner at least, is vital.

In the electrocardiographic section, as has been stated previously, the author presents a number of good illustrative records but the accompanying text is little more than a statement of the various conditions indicated in this type of record. Here too the author has omitted to outline a systematic procedure.

This book can well be recommended not only to those wishing a sufficient knowledge on this subject to explain to them the graphic records so frequently included in the literature, but also to those more acutely interested in polygraphic and electrocardiographic work.

HAROLD E. RICHARDSON, M. D.

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